Gear Units, D Series

Edition 01/2005
OIDCE 0101/0105

Operating Instructions

Stöwer Antriebstechnik GmbH, Enneststr.3, 51702 Bergneustadt, Tel.: 02261-40970, Fax: 02261-41393

Contents

1 How To Use This Manual 5

2 Unit Designation 6
2.1 Detailed unit designation 6
2.2 Nameplate unit designation 7

3 Part List of Standard Type Gear Units 8
3.1 D...00... Type 8
3.2 D...01... Type 9
3.3 D...02... Type 10
3.4 D...03... Type 11

4 Safety 12
4.1 Intended Use 12
4.2 Improper Use 12
4.3 Safety Instructions 13
4.3.1 General Safety Instructions 13
4.3.1.1 Working on the gear reducer 13
4.3.1.2 Operation 13
4.3.1.3 Maintenace 13
4.3.1.4 Lubricant 13
4.3.1.5 Ambient Conditions 13
4.4 Tightening Torques 14
4.5 Case of Fire 14
4.5.1 Suitable extinguishing agents, protective equipment 14
4.5.2 Unsuitable extinguishing agents 14

5 Thinks to Check Before the Gear Unit or Geared Motor is Installed 15
5.1 Transportation 15
5.2 Storage 16

6 Installing The Gear Unit 17
6.1 Before you start 17
6.2 Check the shaft dimensions to fit 17
6.3 Check the ambient temparature 17
6.4 Check the voltage supply 17
6.5 Check the mounting position 20
6.6 Use the breather plug 20
6.7 Check the oil level 20
6.8 Check shaft ends and mounting faces 20
6.9 Cover abresive ambient 20
6.10 Check accessibility to filling, breather and drain plugs 21

7 Mechanical Installation 21
7.1 Installing customer shaft with shoulder 22
7.2 Installing customer shaft without shoulder 23
7.3 Disassembling customer shaft with shoulder 24
7.4 Disassembling customer shaft without shoulder 25
7.5 Shaft tightening torques 26
7.6 Recomended shaft dimensions and disassembling nut dimensions 27
7.7 Assembling customer shaft with shrink disk 28
7.8 Disassembling customer shaft with shrink disk 30
7.9 Assembling gear unit with torque.arm 31
7.10 Fittting outputshaft elements 34
7.11 Correct position of otputshaft elements 34
7.12 Fittting couplings 35

8 Maintanance & Inspection 36

9 Lubrication 37
9.1 Oil types 37
9.2 Changing the oil 37
9.3 Oil quantities 38
9.4 Mounting positions 40

10 Troubleshooting Guide 42

11 Disposal 45
11.1 Disposal of oil 45
11.2 Disposal of sealing 45
11.3 Disposal of metal 45

12 Apendix 46

12.1 Manufacturer's Decleration 47
12.2 Waranty conditions 48
12.3 Waranty 49
12.4 Service Contact Points 50

1 -How To Use This Manual

Take attention to the following safety and warning signs for proper understanding and quick reference.

Electric Hazard; Can cause severe or fatal injuries.

Mechanical Hazard; Can cause severe or fatal injuries.

Likely to be Hazardous; Can cause minor or fatal injuries

Damage Risk; Can damage the drive or environment

Important Information

EC Machinery Directive:
Within terms of the EC machinery directive 98/37/EC, the gear reducer is not considered an autonomous machine, but as a component to install in machines.
Operation is prohibited within the area of validity of the EC directive, until it has been determined that the machine, in which this product is installed, corresponds to the regulations within this directive.

The operating instructions contain important information to ensure;
- Trouble-free operation
- Fulfilment of any rights to claim under guarantee

The operating instruction must be kept close to the gearbox and must be available in case it is needed.

This operating instruction is written for D series gear units and is applicable only for D series. If any different type of gearbox is used please ask Stöwer for the operating instructions of that type.

This instruction can be used only for standard type geared units of STÖWER. For special application and modified gear units ask STÖWER for validity.

This manual does not cover 94/9/EC compatible gearboxes. For 94/9/EC contact us

2 -Unit Designation

2.1- Detailed unit designation

Detailed KR series gear units designation for ordering
(This Designation is different from the short nameplate designation)

3,0kW - 29rpm - 48,86 - DR33 . 00 . 100L/4b - L02

Power (kW) | *Output Speed(rpm)* | *Ratio (i)* | *Type* | *Specification* | *Motor Size* | *Brake*

DR-*With Motor*
DT-*With input shaft*
DV- *With Motor and IEC Flange*
DN-*Without Motor*

00 - *Standart hollow shaft mounting*
01 - *With output shaft*
02 - *With flange and output shaft*
03 - *With flange and hollow shaft*
04 - *With double output shaft*
05 - *With double flansch and double output shaft*
06 - *Double flange hollow output shaft*

X0 - *Special gearbox Standart hollow shaft mounting*
X1 - *Special gearbox with output shaft*
X2 - *Special gearbox with flange and output shaft*
X3 - *Special gearbox with flange and hollow shaft*
X4 - *Special gearbox with double output shaft*
X5 - *Special gearbox with flansch and double output shaft*
X6 - *Special Double flange hollow output shaft*

L - 220 V
With fan
P - 24 V
With fan
S - 220 V
Without fan
Z - 24 V
Without fan

01 - 10 Nm
02 - 25 Nm
04 - 40 Nm
05 - 50 Nm
10 - 100 Nm
20 - 200 Nm
30 - 300 Nm
40 - 400 Nm

Example

0,75-24-58,09-DN33.01-B08

0.75 kW (1500 rpm) geared motor with 80 type B14 flange and output shaft, gearbox type: DR33

10,15-DN33.01-B08

DN33 i=10,15 geared unit with 80 type B14 flange and output shaft

10,15-DT33.01

DT33 i=10,15 geared unit with input shaft and output shaft

2.2- Nameplate, unit designation

Nameplate unit designation is a short abbreviation from the detailed designation

A sample name plate for D Series

Type	: DR33-90L/4		
Power	: 1,5		kW
Speed	: 16		rpm.
Ratio	: 87,62		
Serial Nr.:	04/25520		
M. Pos.	: B3	Oil Qty : 1,3	lt.

OIL FILLED (MINERAL VG220)

Abreviations:
Serial N. : Serial Number
M.Pos. : Mounting Position

Type Designation;

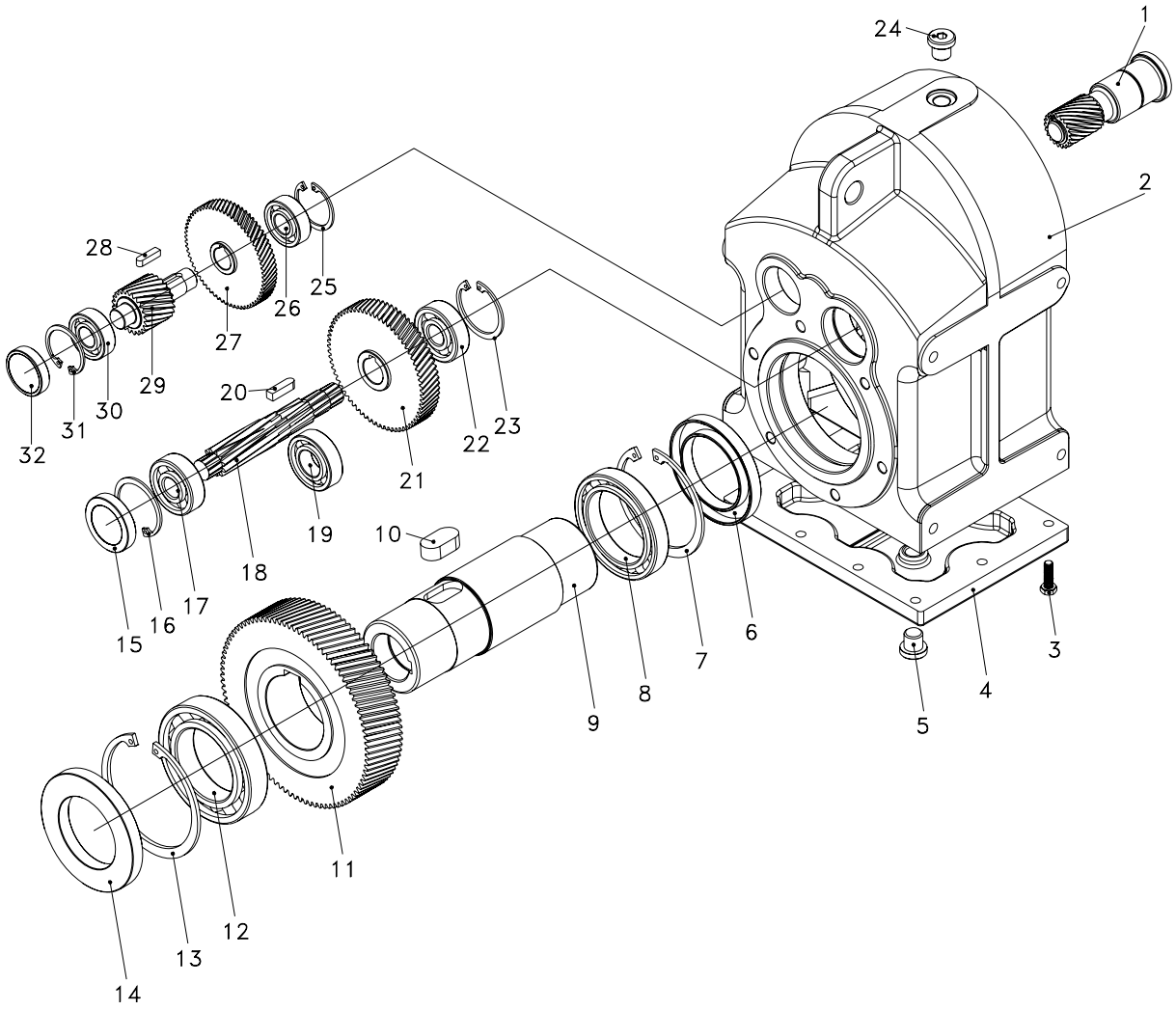
DR33 - 90L/4
Type — Motor Size

DR-*With Motor*
DT-*With input shaft*
DV- *With Motor and IEC Flange*
DN-*Without Motor and IEC Flange*

04 / 25520
Year of manufacturing — **Order Number**

3- Part List of Standard Type Gear Units

3.1- D..00... Types

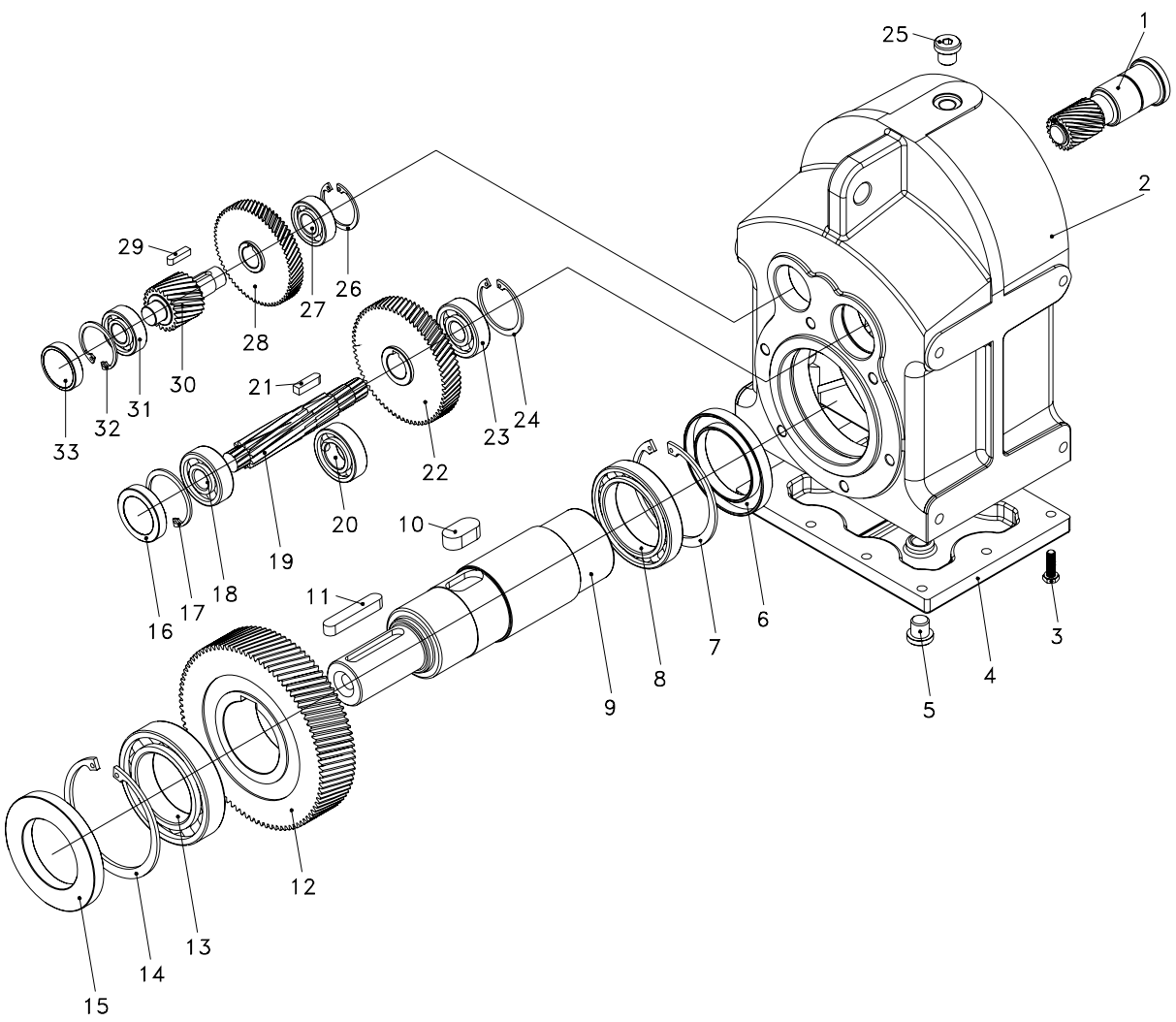


Standard D...00... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pinion	9- Hollow Output Shaft	17- Bearing	25- Circlip
2- Housing	10- Key	18- Pinion Shaft	26- Bearing
3- Bolt	11- Gear	19- Bearing	27- Gear
4- Cover Plate	12- Bearing	20- Key	28- Key
5- Plug	13- Circlip	21- Gear	29- Pinion Shaft
6- Oil Seal	14- Oil Seal	22- Bearing	30- Bearing
7- Circlip	15- Closing Cap	23- Circlip	31- Circlip
8- Bearing	16- Circlip	24- Plug	32- Closing Cap

3.2- D..01... Types

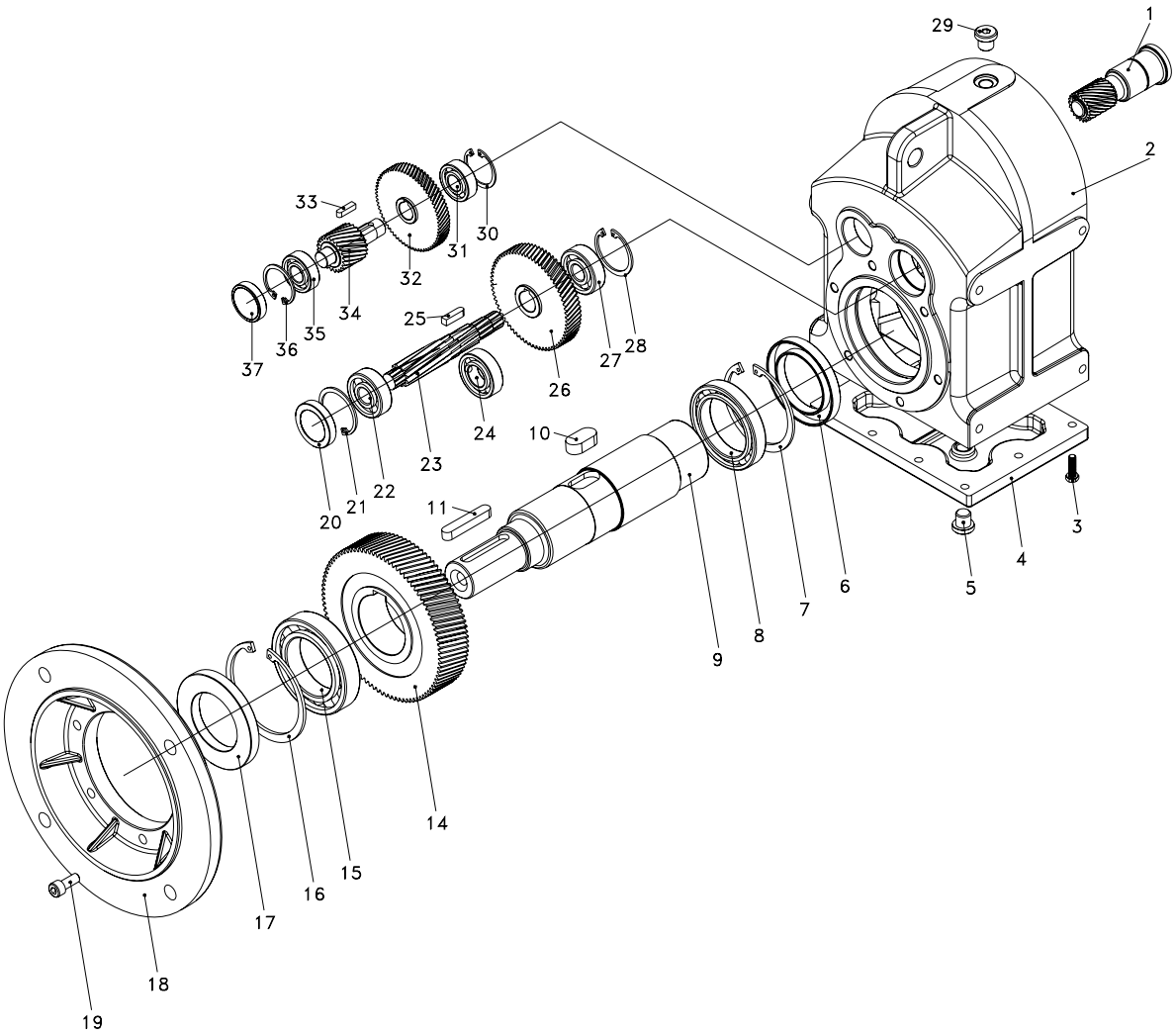


Standard D...01... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pinion	10- Key	19- Pinion Shaft	28- Gear
2- Housing	11- Key	20- Bearing	29- Key
3- Bolt	12- Gear	21- Key	30- Pinion Shaft
4- Cover Plate	13- Bearing	22- Gear	31- Bearing
5- Plug	14- Circlip	23- Bearing	32- Circlip
6- Oil Seal	15- Oil Seal	24- Circlip	33- Closing Cap
7- Circlip	16- Closing Cap	25- Plug	
8- Bearing	17- Circlip	26- Circlip	
9- Solid Output Shaft	18- Bearing	27- Bearing	

3.3- D...02... Types

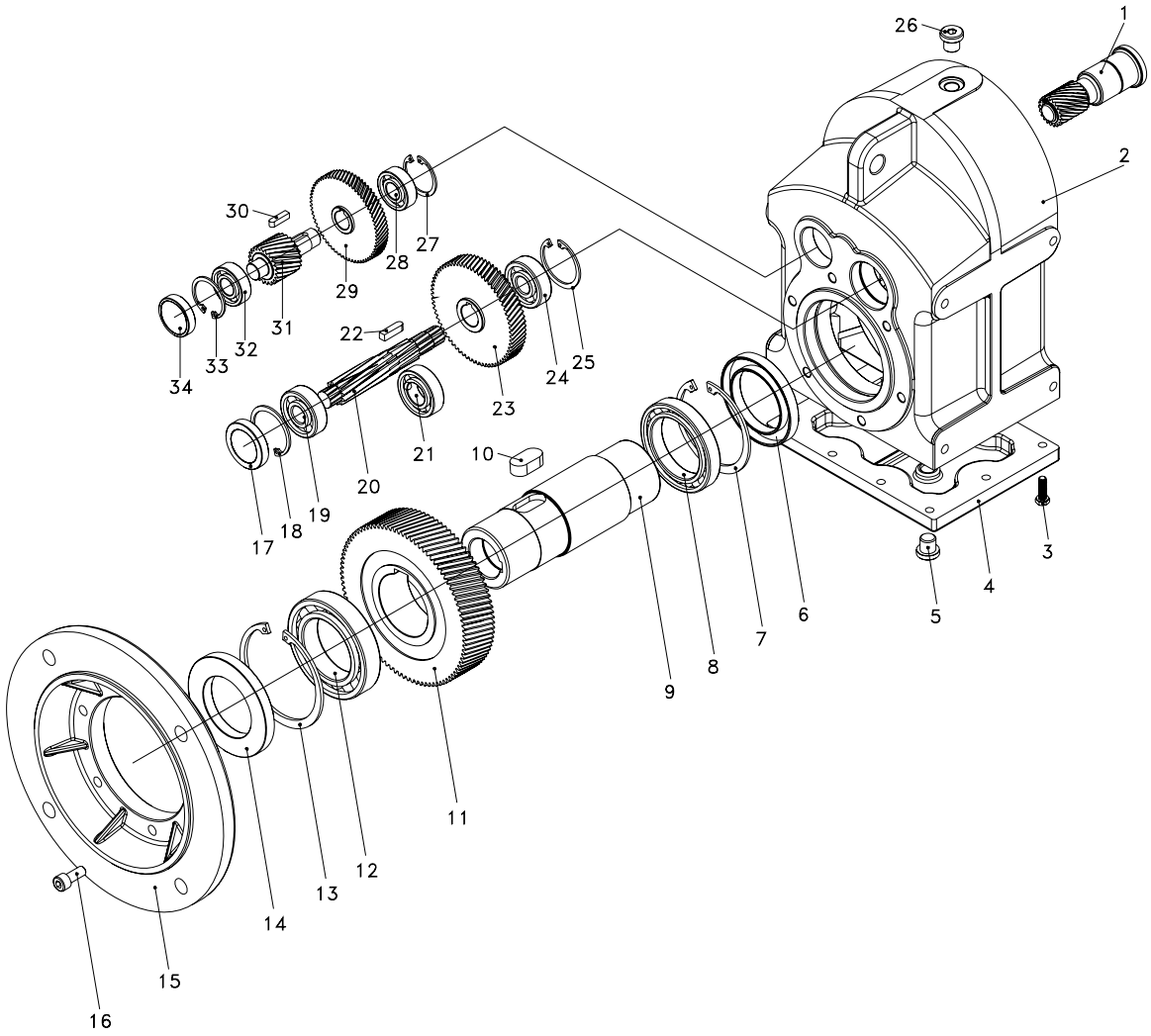


Standard D...02... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pinion	10- Key	21- Circlip	30- Circlip
2- Housing	11- Key	22- Bearing	31- Bearing
3- Bolt	14- Gear	23- Pinion Shaft	32- Gear
4- Cover Plate	15- Bearing	24- Bearing	33- Key
5- Plug	16- Circlip	25- Key	34- Pinion Shaft
6- Oil Seal	17- Oil Seal	26- Gear	35- Bearing
7- Circlip	18- Output Flange	27- Bearing	36- Circlip
8- Bearing	19- Bolt	28- Circlip	37- Closing Cap
9- Solid Output Shaft	20- Closing Cap	29- Plug	

3.4- D...03... Types



Standard D...03... type basic part diagram. Parts may differ for special applications.

Standard Part List

1- Pinion	10- Key	19- Bearing	28- Bearing
2- Housing	11- Gear	20- Pinion Shaft	29- Gear
3- Bolt	12- Bearing	21- Bearing	30- Key
4- Cover Plate	13- Circlip	22- Key	31- Pinion Shaft
5- Plug	14- Oil Seal	23- Gear	32- Bearing
6- Oil Seal	15- Output Flange	24- Bearing	33- Circlip
7- Circlip	16- Bolt	25- Circlip	34- Closing Cap
8- Bearing	17- Closing Cap	26- Plug	
9- Solid Output Shaft	18- Circlip	27- Circlip	

4- Safety

4.1- Intended Use

The gear reducer is designed for use in industrial machines. Please refer to our catalogue or our web page for the maximum permitted torques and speeds. The most important maximum permited values are indicated on the nameplate of the product. But the whool data can be found on our product catalogues. Using the product out of the product catalogue/ nameplate's permited ranges will cancel the waranty/manufacturer decleration and STÖWER will not take any responsibility.

The gear units are intended for industrial machines and may only be used in accordance with the information provided in this manual the product catalogue and the nameplate of the gearbox. They comply with the applicable standards and regulations and meet the requirements of the directive 98/37/EC. The gearbox must be started up, maintained and operated according this manual. The gearbox most be incorporated with 98/37/EC confirming parts/machines.

A motor connected to the gear unit is only allowed to be operated in the frequency entries so that the data provided on nameplate/catalogue of the gear unit is not exceeded and is accordance with the nameplate/catalogue. The speed range will be provided on the name plate if STÖWER is informed that the gear unit will be used with frequency inverter. If not informed the nameplate will have a single fixed speed and only this speed is allowed. The electric motor and frequency inverter must be in accordance with 98/37/EC

If the gear units input is used with variable speed gear unit, this must be informed to Stöwer before ordering and on the nameplate the allowed maximum and minimum speeds (speed range) will be provided. If not mentioned by ordering the gear units speed will be a fixed single input speed and only this speed is allowed.

If the gear unit will be driven by belt / coupling / chain drive etc. the gear unit is only allowed to be used according the nameplate/catalogue entries. Diffrent speed, higher motor power, higher radial/axial loads etc. than nameplate/catalogue is not allowed.

The ambient temperature must be between +5 , +40 celsius and no abresieve media must attack the paint and seals. If different working conditions this must be informed to Stöwer before ordering.

The gearbox maintenance (oil change / check) must be done according this manual

4.2- Improper Use

Every usage which exceeds the limits stated above, the nameplate and catalogue of the product (especially highert torques and speeds) is not compliant with the regulations, and thus prohibited.
The operation of the gear reducer is prohibited if;

- -It was not mounted/installed according to regulations and this manual
- -The gear reducer is very soiled
- -It is operated without lubricant
- -It is operated out of the permited values provided on catalogues and/or nameplate.

4.3- Safety Instructions

4.3.1- General Safety Instructions

4.3.1.1- Working on the gear reducer

- Inappropriately executed work can lead to injury or damage.
Make sure that the gear reducer is only installed, maintained and dismantled by trained technicans.

- Foreign bodies spinning through the air can cause grave injury.
Before putting the gear reducer into operation, check that there are no foreign bodies or tools near the gear reducer

4.3.1.2- Operation

- Touching hot surfaces can leat to burns.
Do not touch the gear reducer if their operation temperatures are too high, or use suitable safety equipment like gloves.

-Rotating machinery can lead to injuries. There is danger of being trapped or pulled in!
Keep a sufficient distance and make safeguarding to rotating machinery. See relevant norms EN349, EN294.

4.3.1.3- Maintenance

-An unintentional start of the machine during maintanance work can lead to serious accidents.
Make sure no one can start the machine while you are working on it.

- Even a brief running of the machine during maintenance work can lead to accidents if the safety devices are not operating.
Make sure that all safety devices are mounted and active.

4.3.1.4- Lubricant

- Extended, intensive contact with oils can lead to skin irritations.
Avoid extended contact with oil, and clean oil off skin thoroghly.

- Hot oil can cause scalding.
When changing oil, protect yourself against contacting hot oil.

4.3.1.5- Ambient Conditions

- Standart gearboxes are allowed to work in ambient temperatures between +5 to +40 celsius unless differently specified on the nameplate. *Using the gear unit out of this range can cause damege to the gear unit or environment. Over +40 celsius ambient conditions the gear unit surface temp could be so high causing burns when touched.*

-If the gear unit will be used in outdoor applications the gear unit must be prevented from rain snow and dust. Entering substances inside the gear unit from seals can damage the gear unit. Observe the safety instructions for outdoor use EN292-1, EN292-2, EN 1050.

4.4- Tightening Torques

All screwed connections for which a tightenning torque is specified, must on principle be tightened with a calibrated torque wrench and checked. Use the follwing torques for the threaded bores over the gear unit housing. For connecting elements refer to the machanical installation part.

Bolt Size	Class	Tightenning Torque [Nm]
M 8	8.8	15
M 10	8.8	20
M 12	8.8	20
M 16	8.8	40
M 20	8.8	80
M 24	8.8	200

4.5- Case of Fire

The gear reducer itself is not combustible. However, it usually contains a synthetic or mineral gear oil. Please observe the following if the gear reducer is situated in a burning environment

4.5.1- Suitable extinguishing agents, Protective equipment

Alwase keep suitable extinguishing, protective equipment like carbon dioxide, powder, foam, fog easly accessible arround the gear unit.

-High temperature produce irritating steam.
Use a protective breathing apparatures.

4.5.2- Unsuitable extinguishing agents

Do not spray with water!

5 -Thinks to Check Before the Gear Unit or Geared Motor is Installed

If gearedmotors are used, please also refer to the manual of the motor manufacturer.

Before you install the gearbox you have to be sure that the gearbox is arrived with the all necessary equipment and without damage. Thinks to take into consideration before you start to install the unit;
- You have received the correct operation manual of the your product.
- The gearbox and all its parts are transported without damage.
- The gearbox is stored correctly according the instructions in this manual
-You have the latest product catalogue or you have acces to our web page

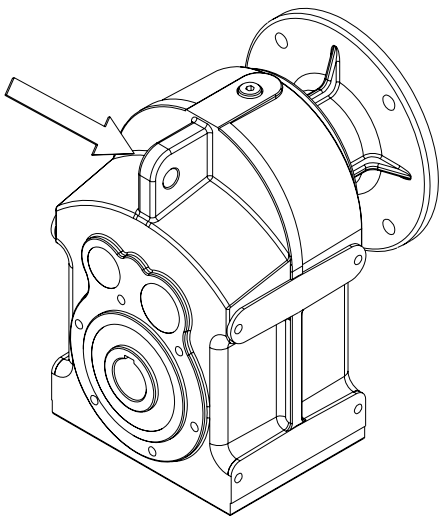
5.1- Transportation

When the goods arrive, first check for any damage. If some damage observed, immediately contact the transport company and inform about the damage. Contact STÖWER for the damage and do not start to install the unit until it is agreed that the damage has no affect of operation.

Use the supplied eyebolts or lifting holes for lifting up the gear unit. The eyebolts are capable to carry the weight of gearboxes only. Do not hang additional loads. Use suitable hoisting equipment which is capable to hold the gear units weight. Refer to the catalogue for various types weights. See drawing bellow for hoisting point.

Do not stay beneath / under the lifting/hoisting equipment which may cause serious injuries by falling down objects, accidental movements, unexpected accidents.

Falling or hard placement can damage the gear unit.
Only use hoisting and securing equipment which is permitted for the size / weigt of your gear unit. Ensure that the load is slowly and carefully handled and placed.



5.2- Storage

If the geared unit or gearedmotor will be stored up to 3 years refer to the following instructions;

With Packing;

-Use corrosion protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. Seal the unit in a plastic wrap and pack it in container. A moisture indicator should be placed around the container to observe the moisture. Relative atmospheric humidity should not exceed 50%. The container should be kept under roof which protects from snow and rain. Under this condition the gear unit can be stored up to 3 year with regular check. The ambient temperature should be between -5 to 60 Celsius degrees

Without Packing;

-Use protection oil for the output shaft and connection surfaces like flange surface or foot assembling surface. If no packing is used and the gearbox is stored without packing, the ambient temperature should be between 5 to 60 Celsius degrees. The gearbox must be kept under enclosed roof with constant temperature and constant humidity not exceeding 50%. The storage should be free of dust and dirt and ventilated with filter. If the gearbox is stored without packing it is recommended not to store more than 2 years and regular check during this time is recommended.

If stored in open protect against insect damage.

6- Installing The Gear Unit

6.1- Before you start;

- Observe the gear unit for damages of storage or transportation. If any damage please contact Stöwer Antriebstechnik GmbH
- Be sure that you have all the equipment necessary for installing like; Spanners, torque wrench, shims and distance rings, fixing devices for input and output elements, lubricant, bolt adhesive etc.

- This manual is not for 94/9/EC (ATEX) conforming gear units. For 94/9/EC conforming gear units refer to the ATEX range manual. ATEX conforming gear units have name plates indicating the zone and the temperature class and are different from standard type geared units. Therefore Standard units can not be installed on Potentially explosive atmospheres.

6.2- Check the shaft dimensions to fit;

Type	Hollow Shaft Diameter	Hollow Shaft Tolerance (H8)	Output Shaft Diameter	Output Shaft Tolerance (DIN748) Up to 50mm k6 Over 50mm m6	Flange Centering Shoulder Diameter	Centering Shoulder Tolerance (g6)
D...22/23...	30	+0.04 0	30	+0.02 0	130	-0.02 -0.04
D...32/33...	35	+0.04 0	35	+0.02 0	180	-0.02 -0.04
D...42/43...	40	+0.04 0	40	+0.02 0	230	-0.02 -0.05
D...52/53...	50	+0.04 0	50	+0.02 0	250	-0.02 -0.05
D...62/63...	60	+0.05 0	60	+0.03 +0.01	300	-0.02 -0.05
D...72/73...	70	+0.05 0	70	+0.03 +0.01	350	-0.02 -0.06

6.3- Check the ambient temperature;

The ambient temperature must be between +5 celsius to +40 celsius for standart type gear units. If different contact Stöwer Antriebstechnik for special solutions.

6.4- Check the voltage supply;

The standard gearedmotors are supplied with 230/400 V 50/60Hz. up to 3kW including 3kW and 400/690 V 50/60 Hz. over 3kW and is indicated on the motors name plate unless it is differently ordered. In case of only gear unit is supplied from STÖWER please observe the name plate of the electric motor and the instructions of the supplier. Check the basic electric connection diagrams below. Use experienced electric technician.

STOP

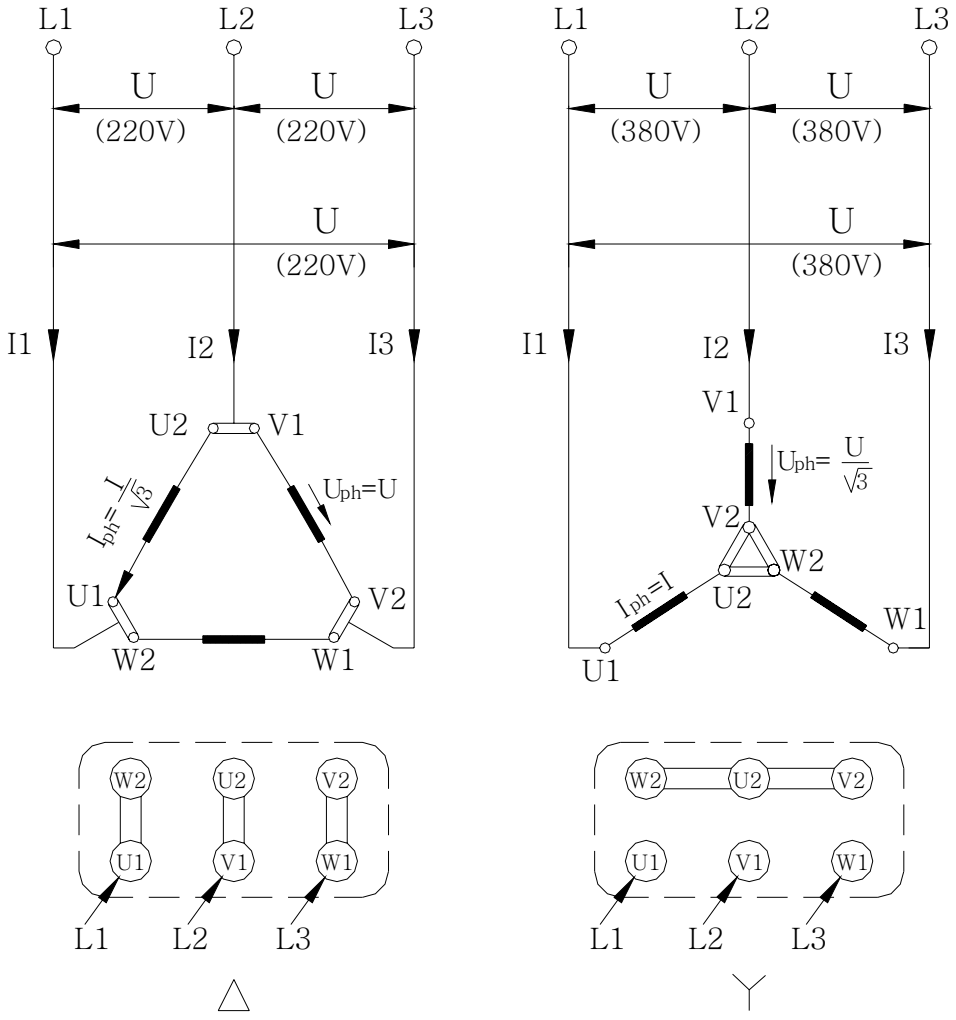
Using wrong connection or voltage can damage the electric motor or environment.

The following wiring diagram is for standart 230/400 V 50Hz AC electric motors. For different voltages please contact STÖWER. For gear units suplied without motor, refer to the motor manufacturers user manuel

The electric connection must be done by experienced electric technician.
The gearbox, the motor and the brake must be grounded to prewent potential differences of earth and gearbox/motor.

Pole Number	Nominal Powers at 400V, 50Hz	
	230V (Δ) / 400 V (Y)	400V (Δ)
2 or 4	≦ 3 kW	⩾ 4 kW
6	≦ 2,2 kW	⩾ 3 kW
8	≦ 1,5 kW	⩾ 2,2 kW
Starting Principle	Direct	Direct or Y/Δ

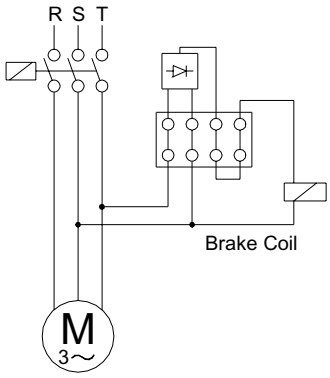
Basic motor connection wiring diagram



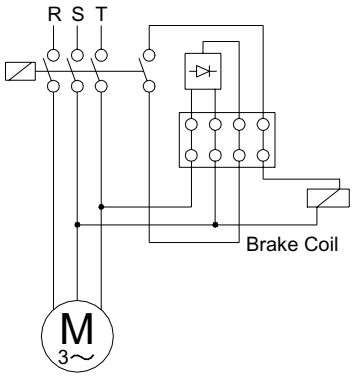
Standard type brakes basic wiring diagram

The elctric connection must be done by experienced electric technician.
The gearbox and the motor must be grounded to prewent potential differences of earth and gearbox/ motor.

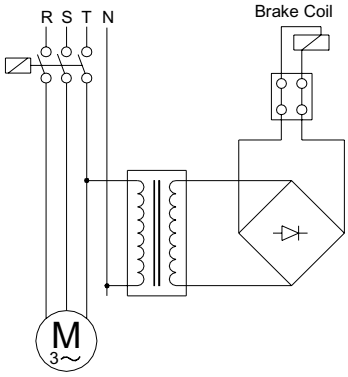
Delayed Running Brake (380 V)



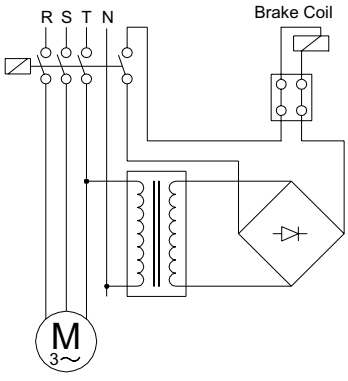
Sudden Brake (380 V)



Delayed Running Brake 4 (24 V)



Sudden Brake (24 V)



6.5- Check the mounting position;
The mounting position must be in accordance with the mounting position mentioned on the name plate. If different please contact STÖWER for possibilities of using in a different mounting position. Refer to the mounting positions and oil quantities on this manual and adjust the oil level accordingly with the recommended oil types given on this manual.

Do not mix synthetic oils with mineral oils which can cause serious damage on the gear unit.

6.6- Use of breather plug;
Breather plugs are not needed for D series under normal ambient and working conditions (Up to 30 degree Celsius ambient temperature and up to 8 hours per day) . If heavy ambient conditions and long time working hours then breather plug are recommended by STÖWER and delivered with the gearbox together. Replace the breather plug with the most top plug according to your mounting position.

Some plug positions are not machined according mounting position. If no mounting position is mentioned by ordering the standard B3 position plugs are machined.

6.7- Check the oil level ;
On the mounting position tables the oil level plug is shown. Please refer to those tables and be sure that the oil level is correct according the mounting position by screwing half way out the level plug and see if oil comes out from that plug. If oil comes out tighten the plug again. If no oil comes out take out the filling plug and add oil until oil comes out from the level plug and tighten both plugs after finish. Be sure you are using the correct oil mentioned on the oil tables on this manual.

Do not mix synthetic oils with mineral which can cause serious damage on the gear unit.

6.8- Check shaft ends and mounting faces;
Before you start to installing be sure that all the connection elements are free of oil and dust. The output shaft may be protected by anti-corrosion oil. Please remove this using available solvents on your market. By using this do not touch sealing lips or painting of the housing.

6.9- Cover abrasive ambient;
If the gear unit will be placed on a abrasive ambient be sure that the output seals are covered so that no abrasive material, chemicals or water touches the seals. Any pressure coming from outside over the seals can cause that the out staying substances to enter the gearbox and cause serious damage to the gear unit. If pressure or abrasive material can not be prevented from coming over the sealing, contact STÖWER for solutions.

Abrasive material, chemicals, water, positive or negative pressure exceeding 0,2 bar can affect or damage the sealing lip or output shaft. Inside entering substances from the seals can cause serious damage to the gear unit.

6.10- Check accessibility to filling, breather and drain plugs;
The filling, breather and drain plugs must be freely accessible for further checking and service.

7- Mechanical Installation

The gear unit can only be installed using the supplied connection points like foot and flange assembling points.

To install the gear unit without the supplied connection points can cause serious injuries by loosening or braking the gear unit. Even the gear unit is installed totally correctly according this manuel, be sure that no one will be harmed by accidentially brake downs or loosenings.

The mounting plate must be rigid enough not allowing torsions, flat enough to prevent strains by tightening the bolts and stable enough not allowing vibrations. By using chain drives this becomes much more important because of the polygon effect on chain drives. According to your connection elements the maximal permitted radial and axial load of the gear unit must be in accordance with your application. Check the product catalogue for permitted radial loads and calculation.

If the output or input shaft is overloaded by radial or axial loads it can cause serious damage to the gear unit.

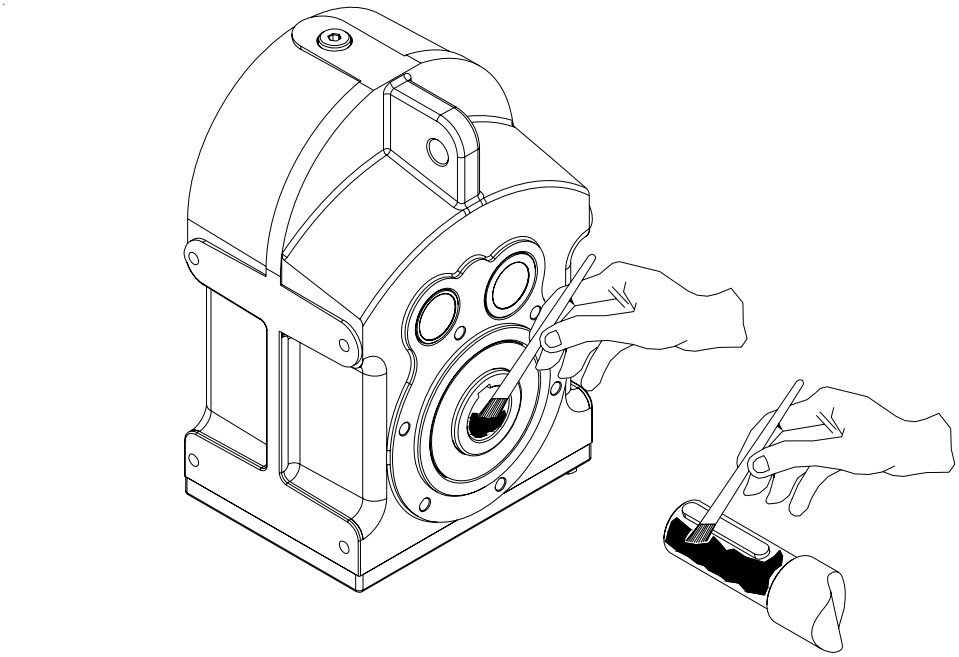
Secure the gear unit using 8.8 or higher quality bolts.

Cover all the turning parts from human entering or touching. Turning parts can cause severe or fatal injuries.

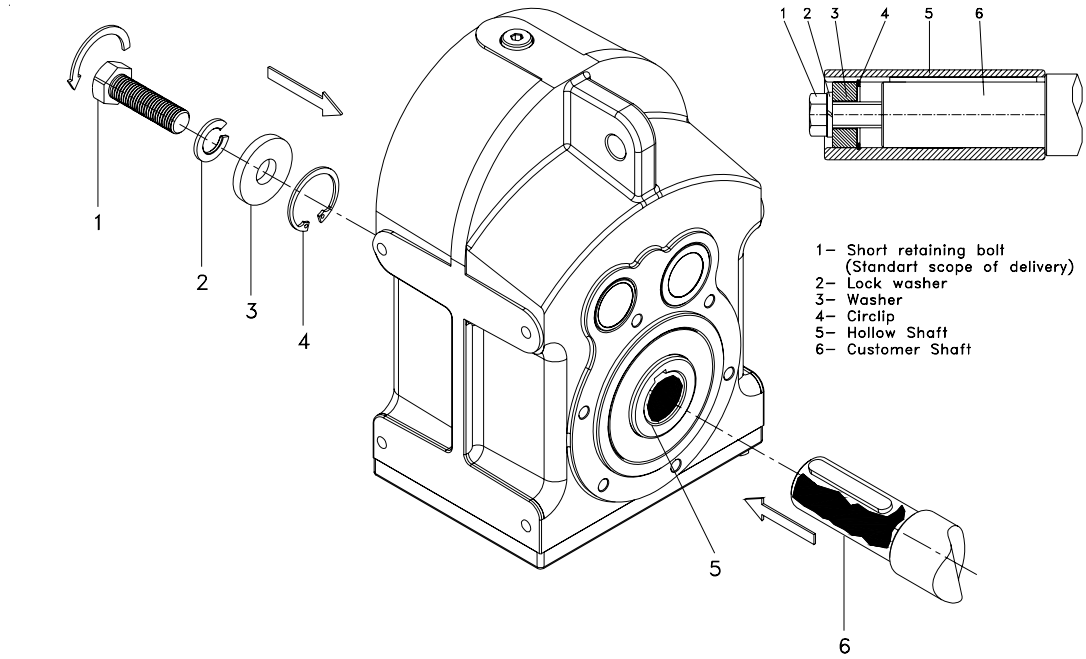
For different kind of basic installations refer to the following illustrations.

7.1- Installing customer shaft with shoulder

7.1.1- Use anti-seize assembling paste available on your market. Use a brush to apply the paste.

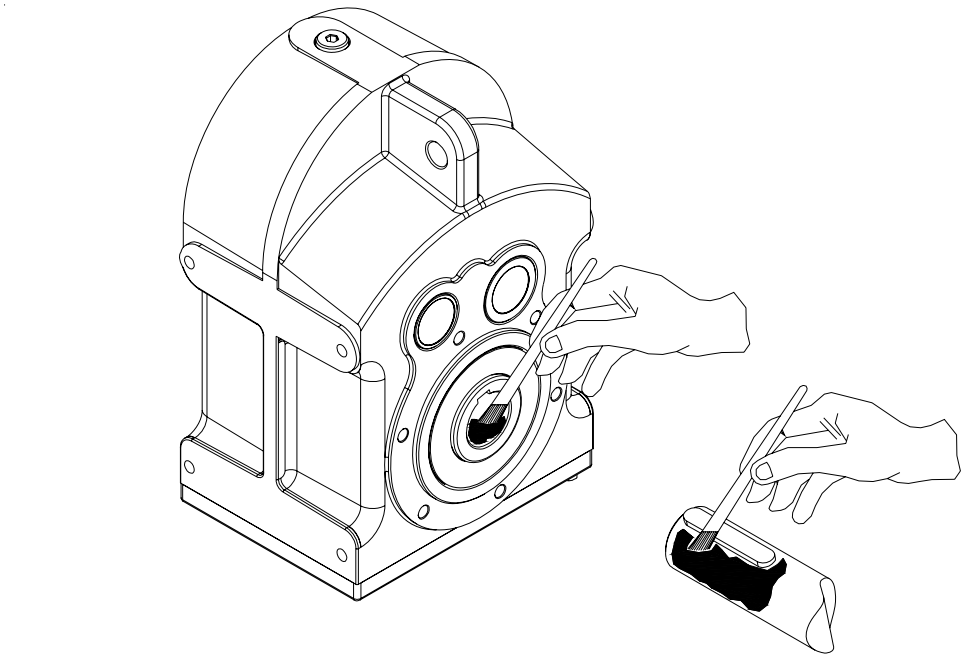


7.1.2 -Fasten the bold as shown below.

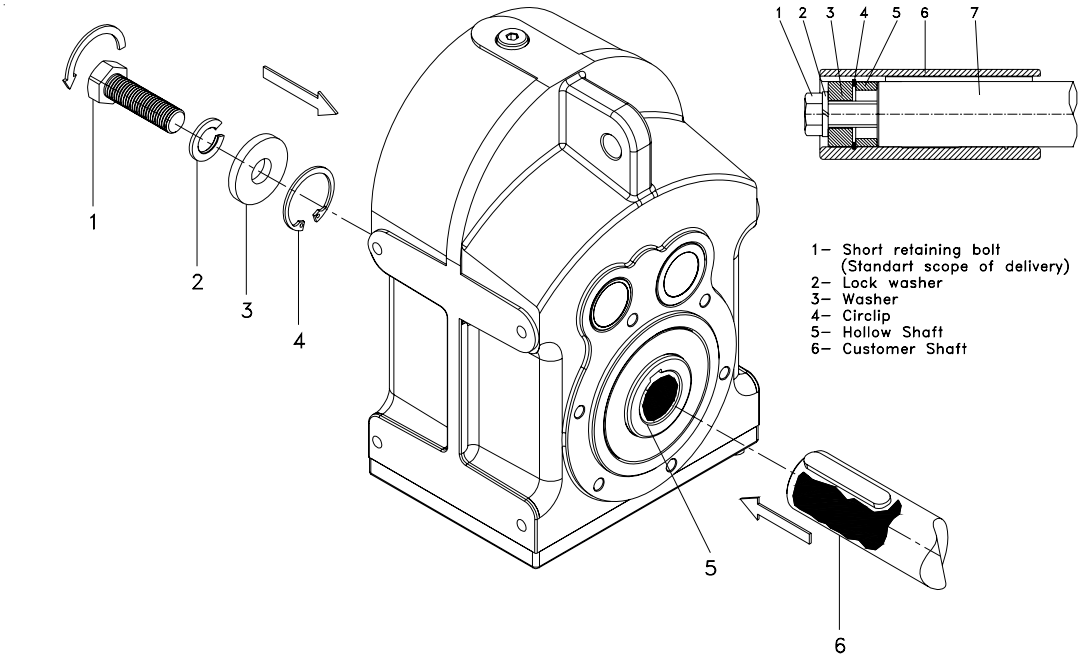


7.2- Installing customer shaft without shoulder

7.2.1- Use anti-seize mounting paste available on your market. Use a brush to apply the paste.

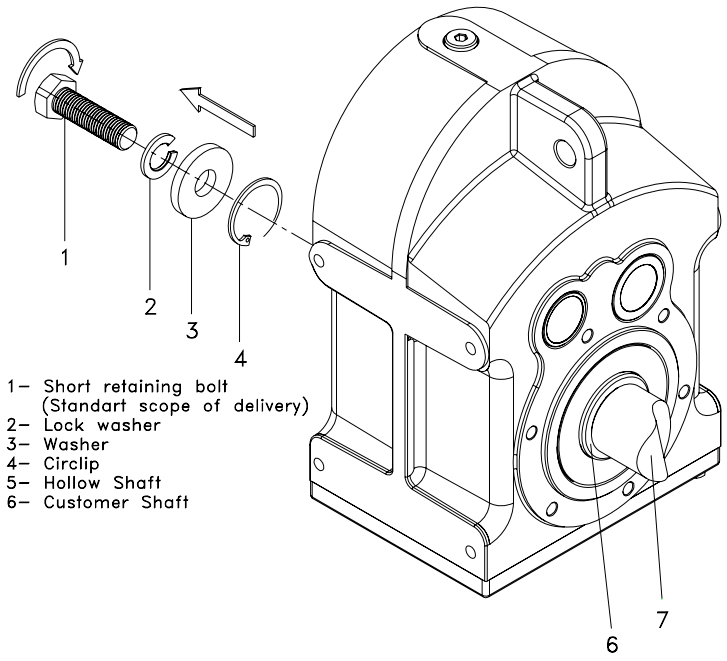


7.2.2 -Fasten the bold as shown below.

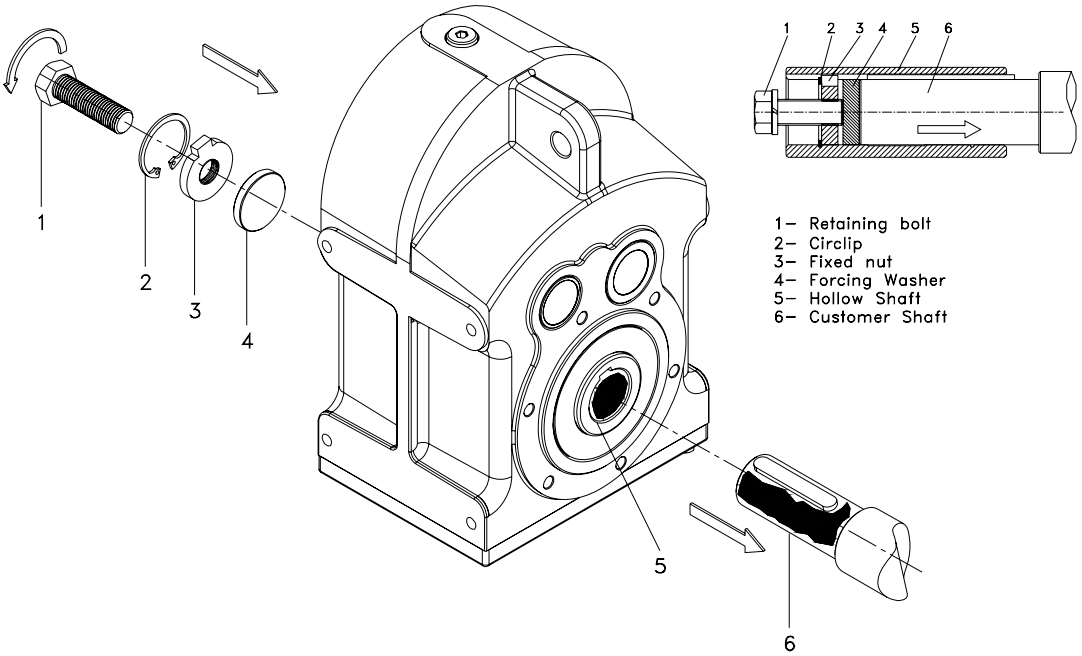


7.3- Disassembling customer shaft with shoulder

7.3.1- Disassemble the bolt and take out the parts as shown

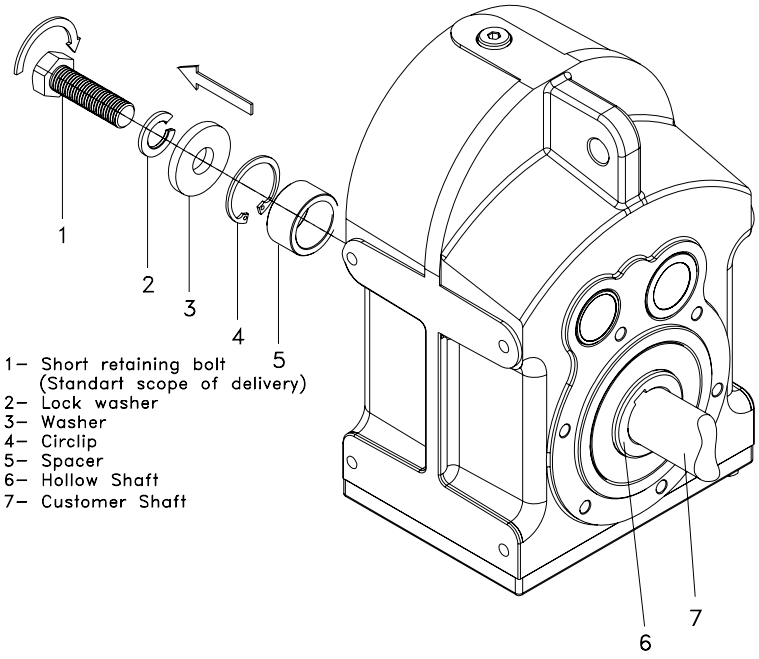


7.3.2 -Use the disassemble set from Stöwer and fasten the bold as shown bellow to take out the output shaft. For disassemble sets look the following pages.

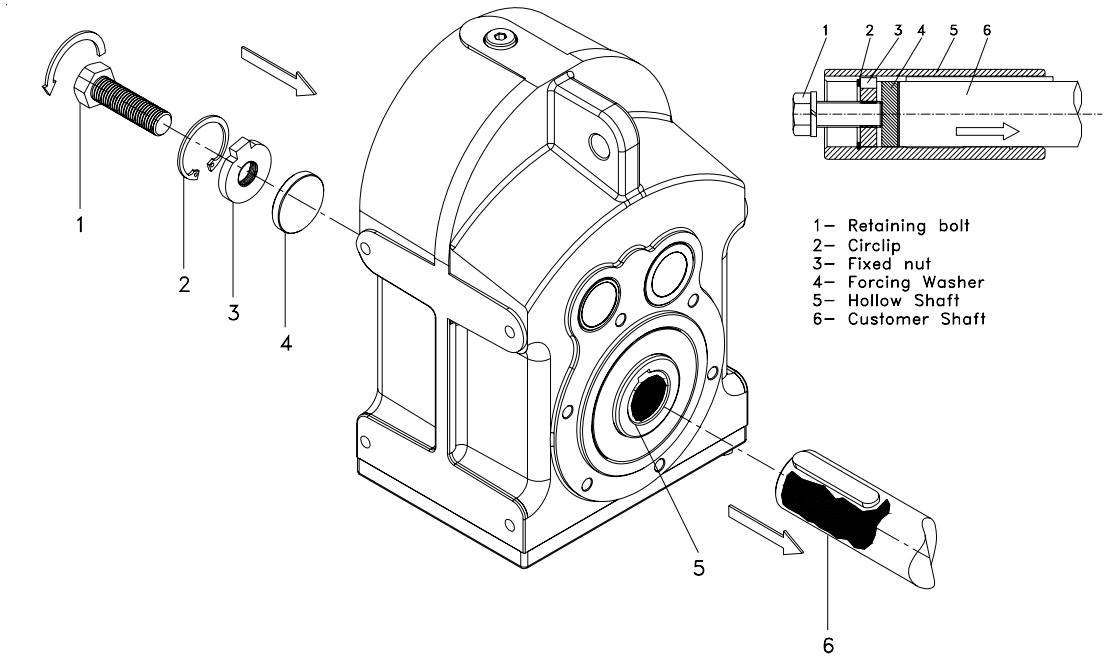


7.4- Disassembling customer shaft without shoulder

7.4.1- Disassembly the bolt and take out the parts as shown

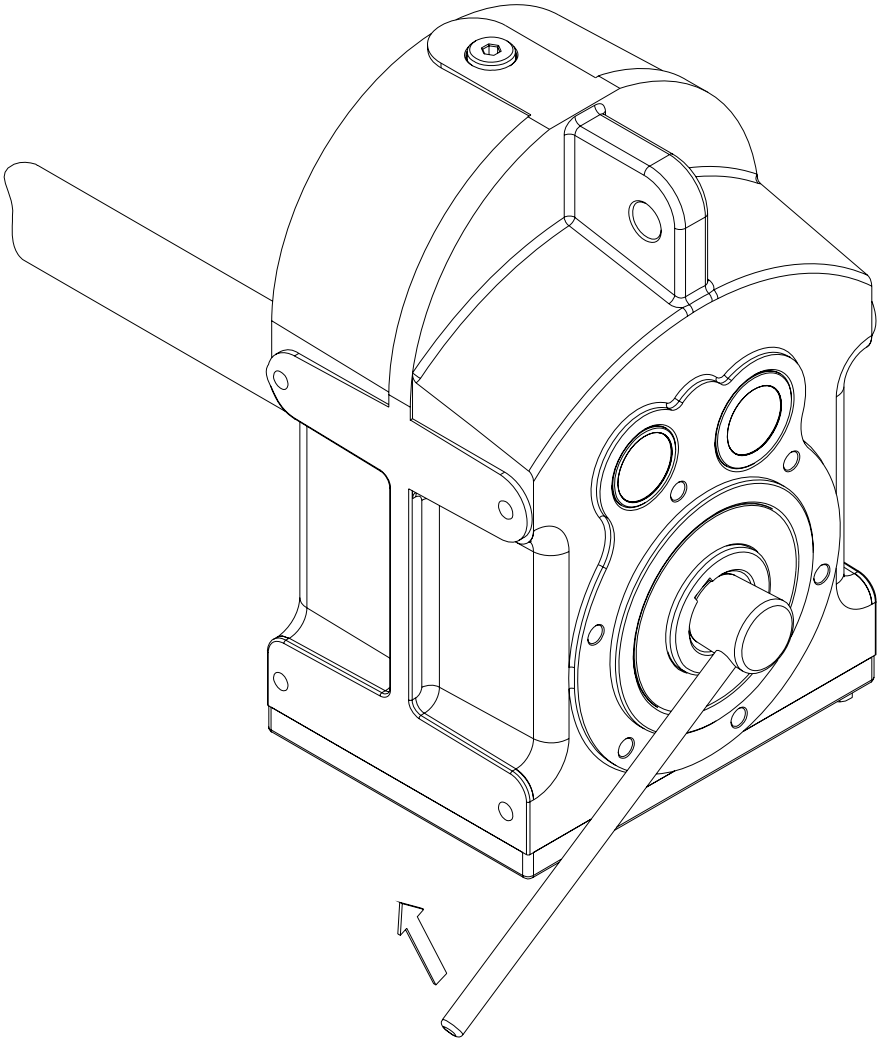


7.4.2 -Use the disassembly set from Stöwer and fasten the bold as shown bellow to take out the output shaft. For disassembly sets look the following pages.



7.5- Shaft tightening torques

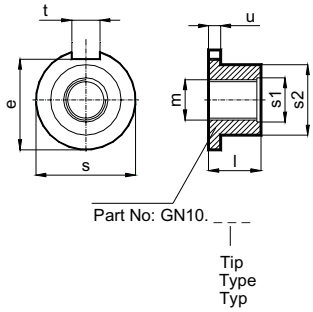
Use the following table for shaft tightening torques.



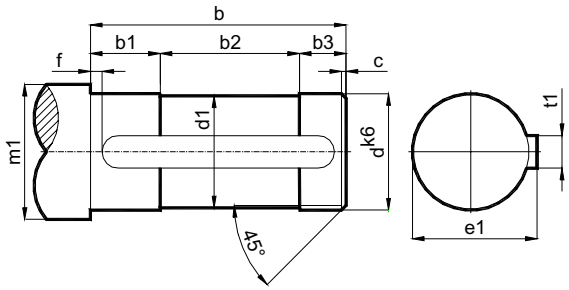
Type	Bolt	Tightening torque [Nm]
D.22/23...	M10	20
D.32/33...	M12	20
D.42/43...	M16	40
D.52/53...	M16	40
D.62/63...	M20	80
D.72/73...	M20	80

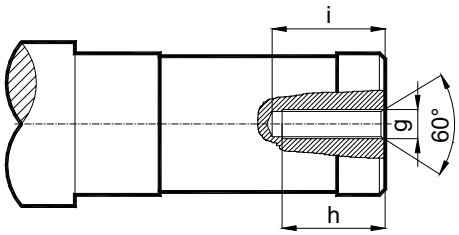
7.6- Recomended shaft dimensions and disassembling nut dimensions

Use the following part number for ordering the disassembling nut.



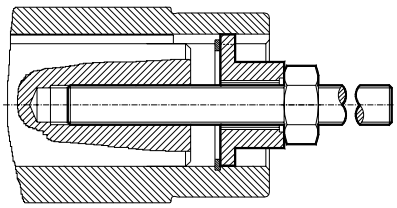
Part no example: GN10.DR33



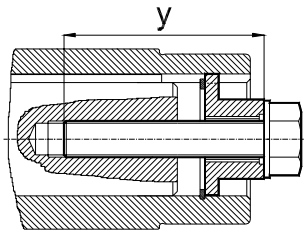


Tip *Type* Typ	s	s1	s2	m	l	u	t	e	y	d	d1	b	b1	b2	b3	c	m1	f	h	i	g	e1	t1
D23	29.5	16	24	M14	20	6	8	27	**48**	30	29	120	30	80	10	2	45	5	22	30	M10	33	8
D33	34.5	22	30	M20	20	6	10	30	**62**	35	34	150	35	105	10	2	55	5	36	45	M12	38	10
D43	39.5	22	35	M20	26	6	12	35	**68**	40	39	174	45	114	15	2	75	5	36	45	M16	43	12
D53	49.5	26	45	M24	26	6	14	44,5	**74**	50	49	195	55	118	22	3	85	5	42	53	M16	53,5	14
D63	59.5	26	55	M24	33	8	18	53	**84**	60	59	230	55	158	17	3	95	5	42	53	M20	64	18
D73	69.5	32	65	M30	38	10	20	62,5	**98**	70	69	290	95	150	45	4	120	5	50	63	M20	75,4	20

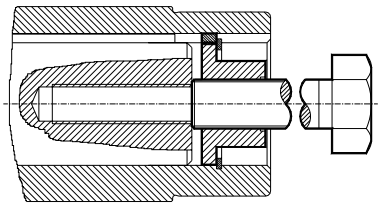
Dismounting



Mounting

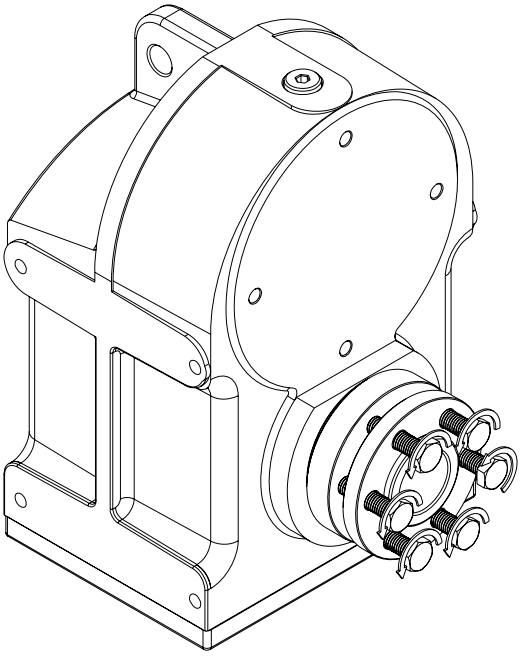


Pulling Out

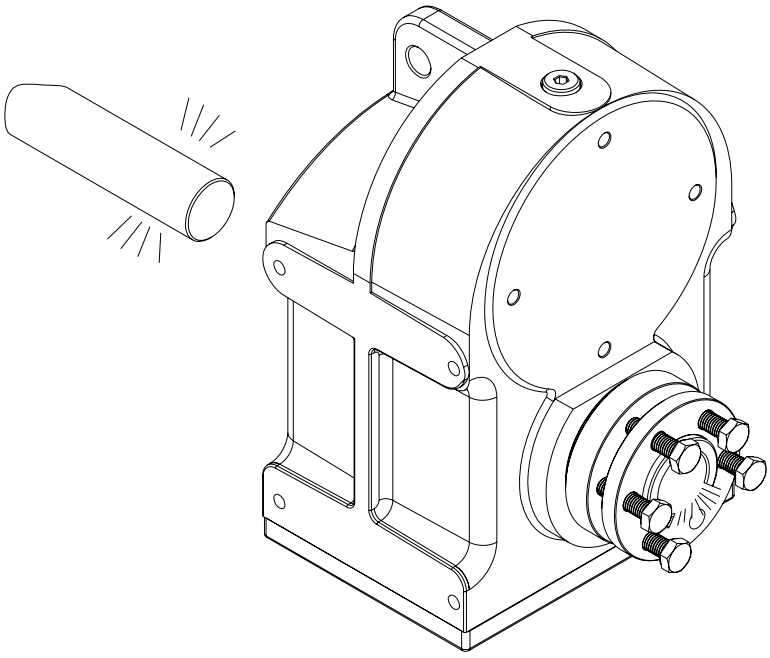


7.7-Assembling customer shaft with shrink disk

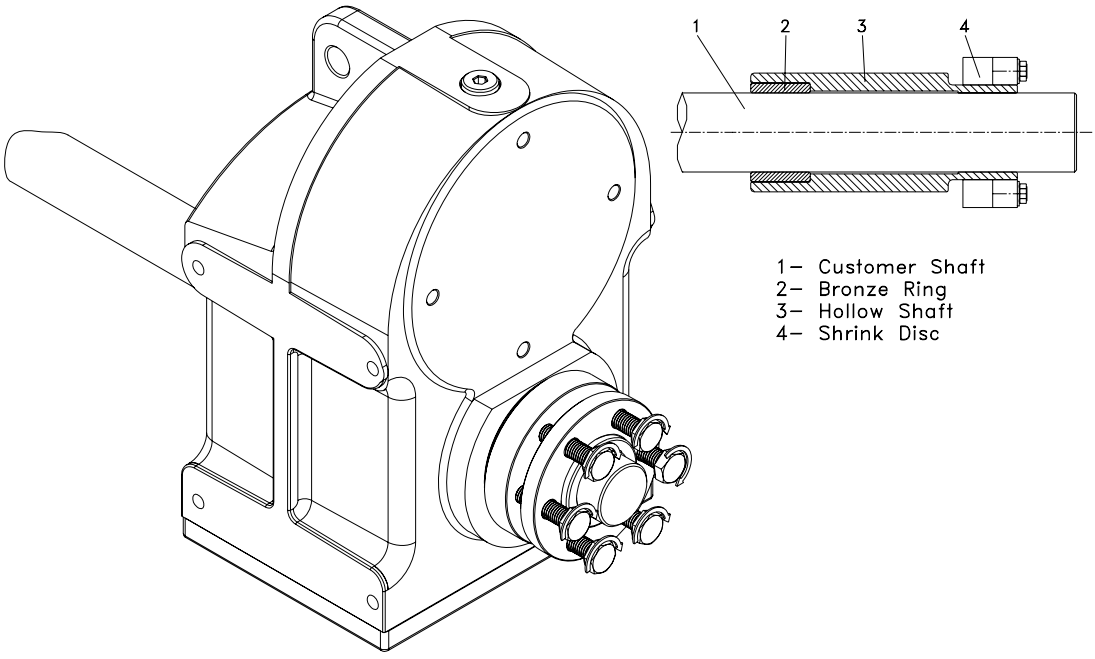
7.7.1- Loosen the bolts of the shrink disk



7.7.2-Use a solvent available in your market to clean all the dirt an oil from the shaft and shrink disk hollow. The surfaces must be free from oil or any dirt. The solvent must be removed from the surfaces ass well.



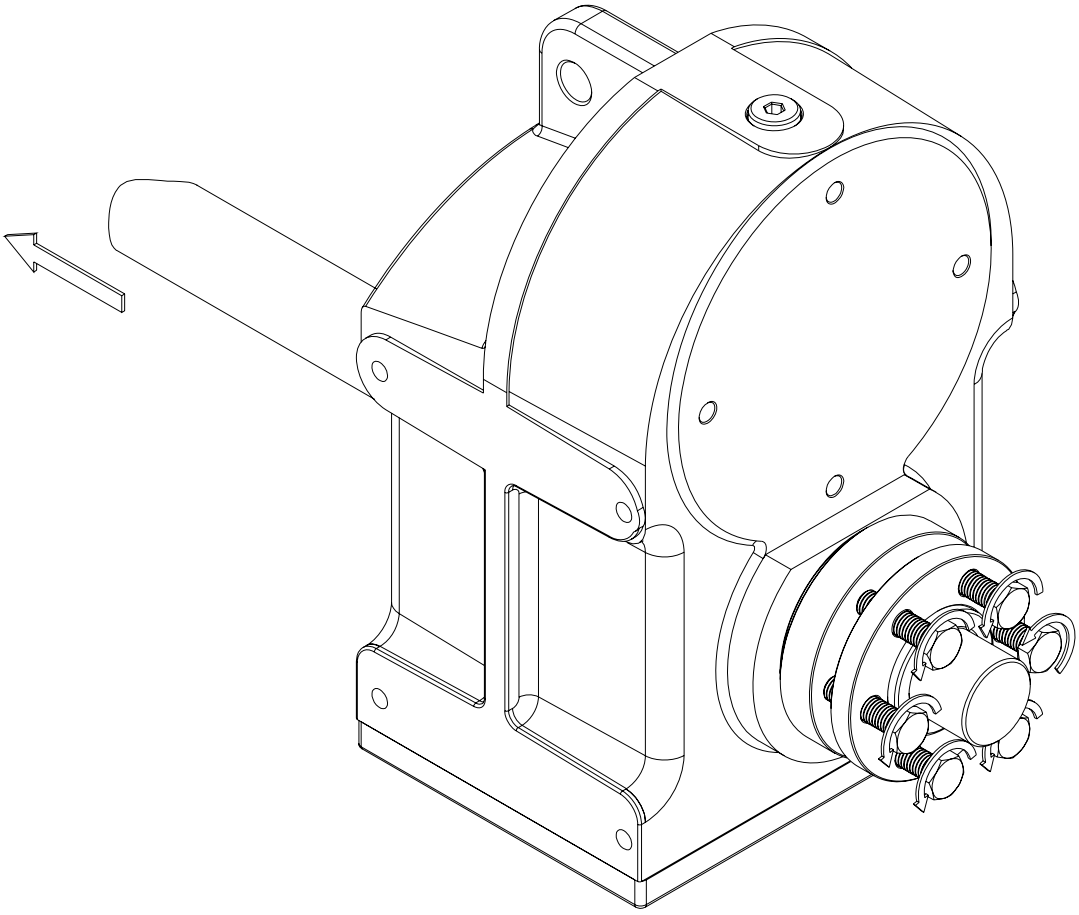
7.7.3- Insert the shaft and tighten the bolts as shown. Be sure that there is a clearance between the shrink disk shoulder and the hollow shaft shoulder of the gearbox.



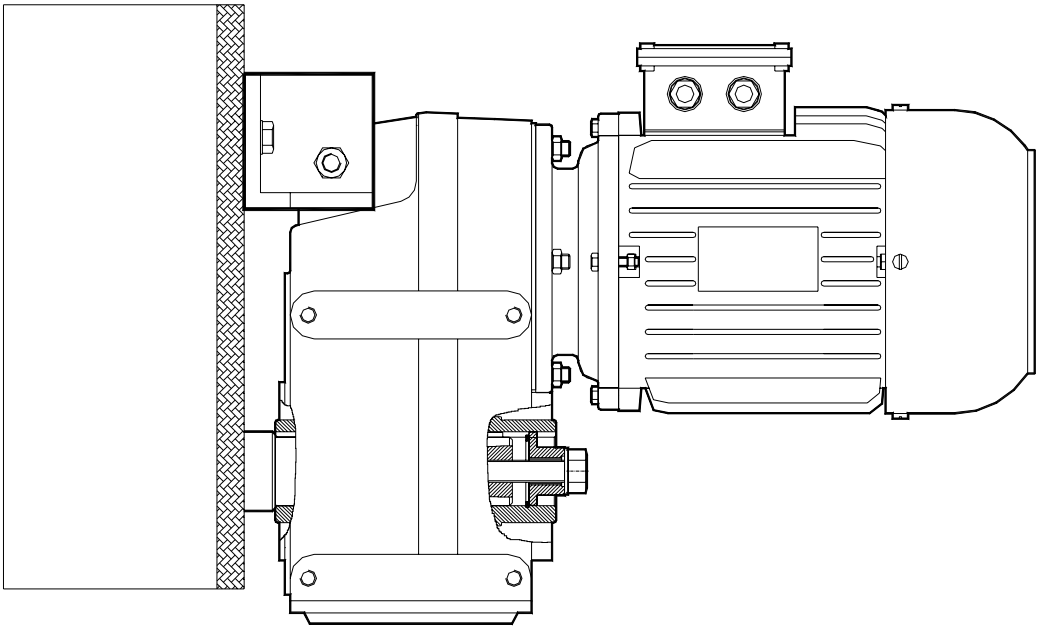
Type	Bolt	Tightening Torque [Nm]
D.2...	M5	5
D.3...	M6	12
D.4...	M8	30
D.5...	M8	30
D.6...	M10	60
D.7...	M10	60

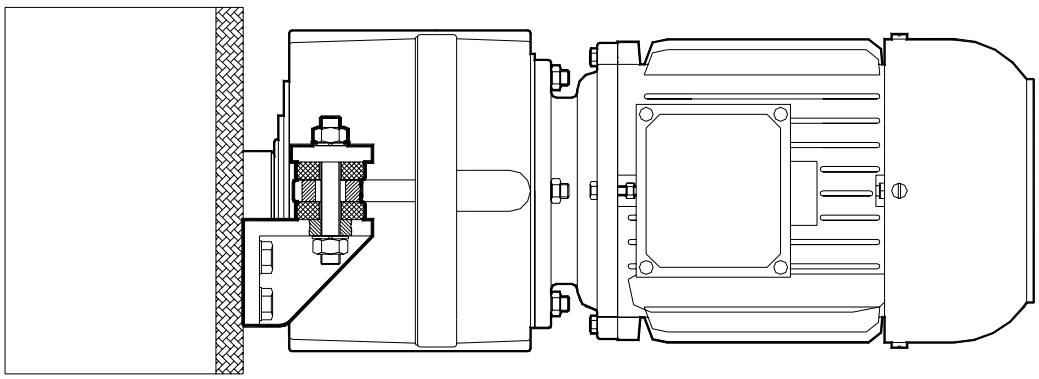
7.8- Disassembling customer shaft with shrink disk

7.8.1- Loosen the bolds of the shrink disk and take out the shaft.

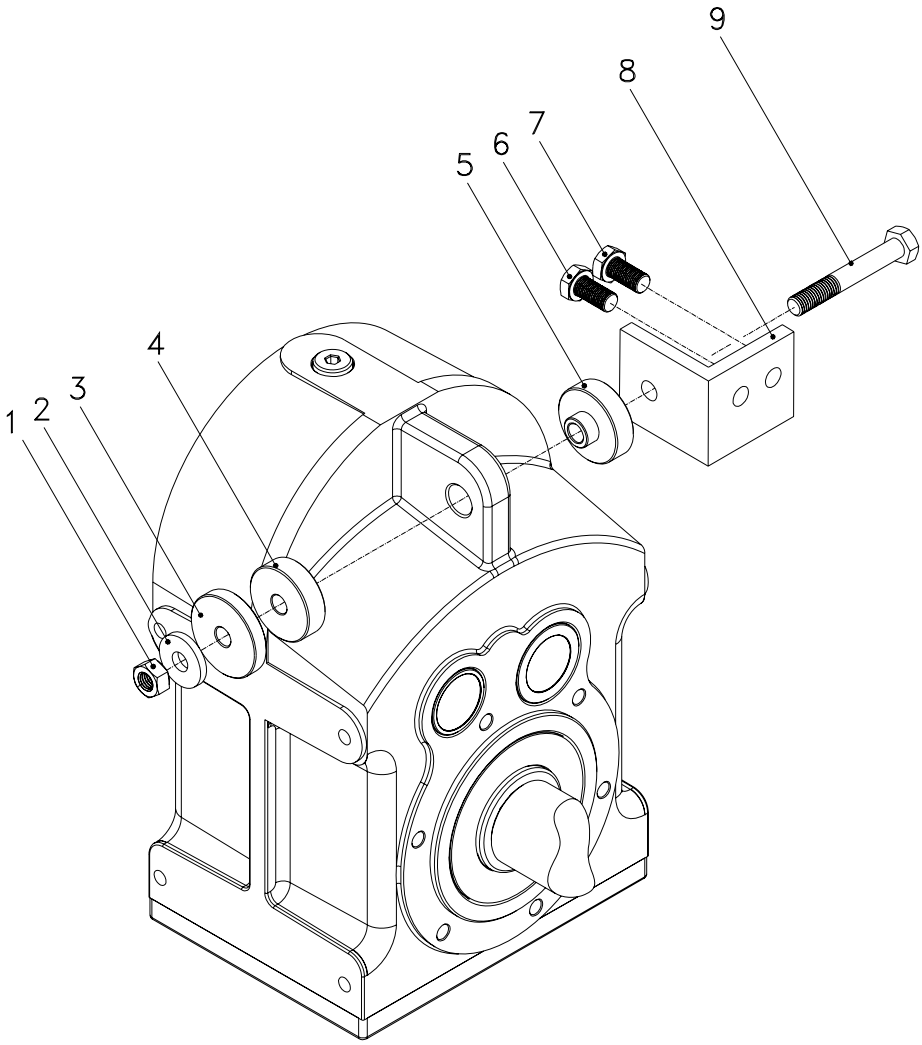


7.
7.



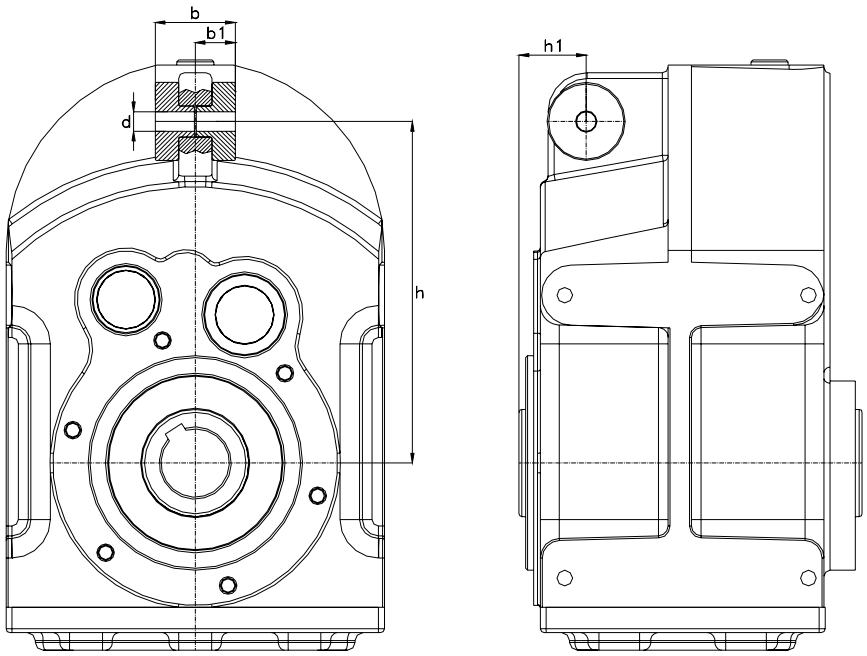


7.9.2-Assemble the parts as shown bellow



1- Nut	4- Rubber Buffer	7- Bolt
2- Washer	5- Rubber Bufer	8- Fixing Plate
3- Spacer Ring	6- Bolt	9- Bolt

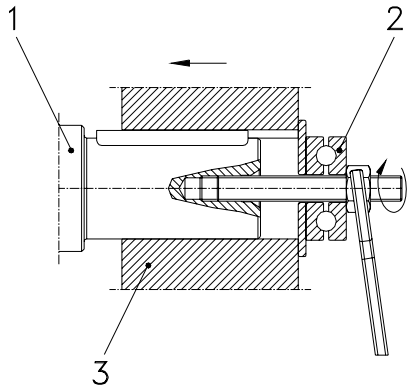
7.9.3-For the fixing bold position refer to the following dimensions



					Std.	T1	T2
Type	b	b1	d	R	h	h1	h2
DR23.10	40	20	12	27,5	200	150	170
DR33.10	50	25	14	27,5	250	182	210
DR43.10	55	27,5	14	27,5	300	220	251
DR53.10	60	30	16	27,5	350	245	260
DR63.10	70	35	26	50	450	335	360
DR73.10	80	40	28	55	550	400	410

7.10- Fittting outputshaft elements

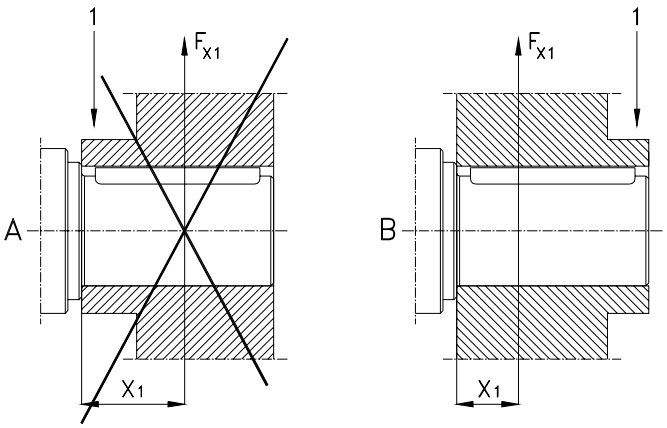
Use the following ilustration to assemble output shaft units



1) Gear shaft end
2) Thrust bearing
3) Coupling hub

7.11- Correct position of otputshaft elements

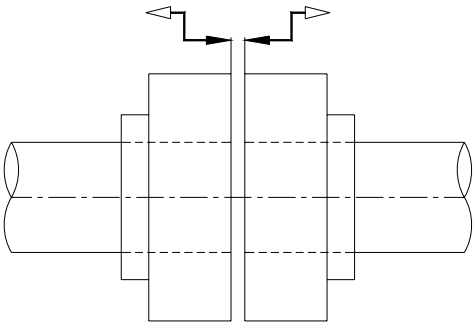
The Output Shaft unit (transmision elements) must placed as close as possible to the gear unit so that the radial load is as closest as possible to the gear unit.



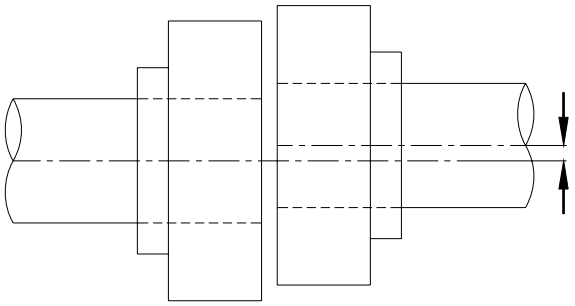
1) Hub

7.12- Fittting Couplings

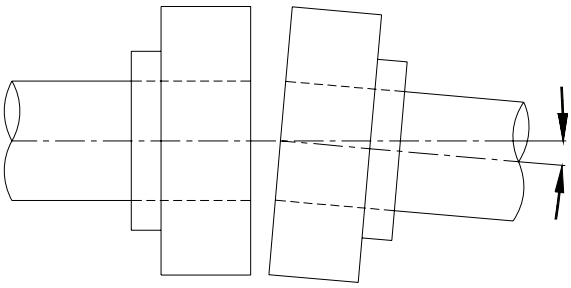
7.12.1-By fitting couplings be sure that there is some clearanve between the two elements



7.12.2-By fitting couplings be sure that there is no exantricity between the two shafts.



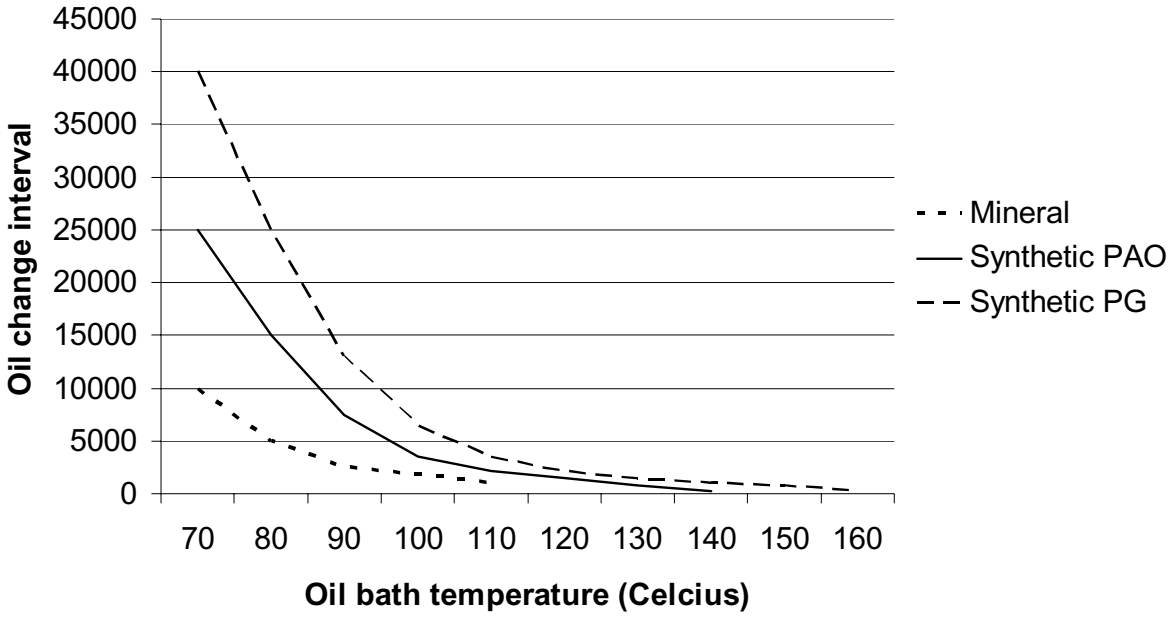
7.12.3-By fitting couplings be sure that the two shafts are not angular miss-aligned.



8- Maintanance and Inspections

Under normal ambient and working conditions the gear unit should be checked according the following intervals. (For definition of normal working conditions refer to the product catalogue: "Selecting Gearbox" section);

Item to check / replace	Every 3.000 working hours or every 6 months	Every 4.000 working hours	Every 10.000 working hours or every 3 years	Every 25.000 working hours
Check for oil leakage	x			
Check for oil level	x			
Check oil leakage from seal	x			
Check Rubber buffer	x (Change if necessary)			
Check Bearings Noise		x (Change if necessary)		
Change Mineral Oil			x (See Below for details)	
Change Synthetic-PAO Oil				x (See Below for details)
Change Sealing				x
Change Bearing Grease				x
Change Bearings				x
Check for noise Changes				x



For normal ambient conditions 70 degrees celsius oil bath temp. should be taken as referance

* For D series Mineral oil is used unless it is differently ordered. For oil type and quantities refer to the following tables.

9- Lubrication
9.1- Oil Types

Lubricant	*Usage Temparature*	*ISO Viscosity Class*	ARAL	bp	ESSO	KLÜBER LUBRICATION	Mobil	Shell	Castrol
Mineral Oil	0 ... +100	ISO VG 680	Degol BG 680	Energol GR-XP680	Spartan EP 680		Mobilgear 636	Omala 680	Alpha SP 680
	0 ... +100	ISO VG 460	Degol BG 460	Energol GR-XP460	Spartan EP 460	GEM 1 680	Mobilgear 634	Omala 460	Alpha SP 460
	0 ... +100	ISO VG 320	Degol BG 320	Energol GR-XP320	Spartan EP 320	GEM 1 460 GEM 1 320	Mobilgear 632	Omala 320	Alpha SP 320
	-5 ... +100	**ISO VG 220**	**Degol BG 220**	**Energol GR-XP220**	**Spartan EP 220**	**GEM 1 220**	**Mobilgear 630**	**Omala 220**	Alpha SP 220
	-5...+100	ISO VG 150	Degol BG 150	Energol GR-XP150	Spartan EP 150	GEM 1 150 GEM 1 100	Mobilgear 629	Omala 150	Alpha SP 150
	-5...+100	ISO VG 100	Degol BG100	Energol GR-XP100	Spartan EP 100		Mobilgear 627	Omala 100	Alpha SP 100
Synthetic Oil	-20 ... +140	ISO VG 680	Degol GS 680	Enersyn SG-XP680		Syntheso D 680 EP	Gylgoyle HE 680		
	-20 ... +140	ISO VG 460	Degol GS 460	Enersyn SG-XP460	Glycolube 460	Syntheso D 460 EP	Gylgoyle HE 460	Tivela SD	Alphasyon PG 460
	-25 ... +140	ISO VG 320	Degol GS 320	Enersyn SG-XP320	Glycolube 320	Syntheso D 320 EP	Gylgoyle HE 320		Alphasyon PG 320
	-25 ... +140	**ISO VG 220**	**Degol GS 220**	**Enersyn SG-XP220**		**Syntheso D 220 EP**	**Gylgole HE 220**	Tivela WB	Alphasyon PG 220
	-30 ... +140	ISO VG 150	Degol GS 150	Enersyn SG-XP 150		Syntheso D 150 EP			Alphasyon PG 150
	-30 ... +140	ISO VG 100		Enersyn SG-XP 100		Syntheso D 150 EP			
Minaral *Grease*	-20 ... +120		Aralup HL 3	Energrease LS 3	Beacon 3	Centoplex 2	Mobilux 2	Alvania R3	Spheerol APT 3
Synthetic Grease	-30 ... +100					ISOFLEX Topas L152	Mobiltemp SHC 100	Cassida RLS 00	

9.2- Changing the oil

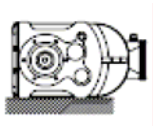
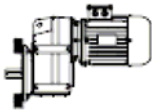
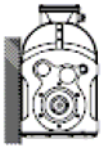
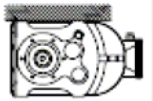
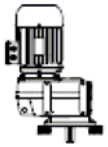
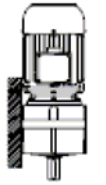
Refer to the nameplate to find out the correct oil filled inside the gearbox.

-Do not mix sythetic oils with mineral oils which will cause serious damage to the gear unit. The oil change must be done by using the filling, draining and level plugs according the mounting position illustrated in section 9.4.

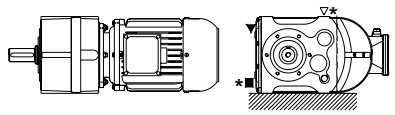
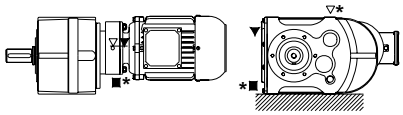
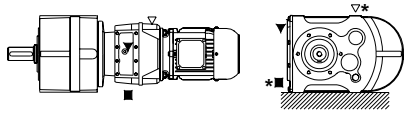
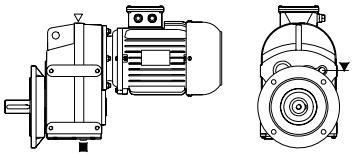
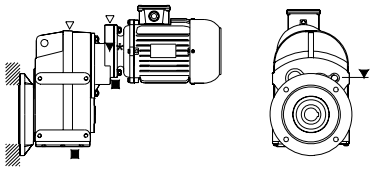
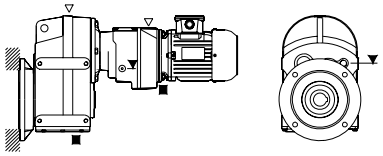
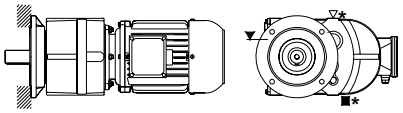
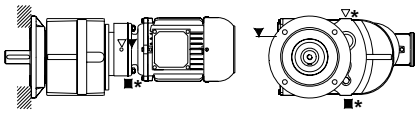
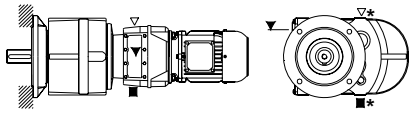
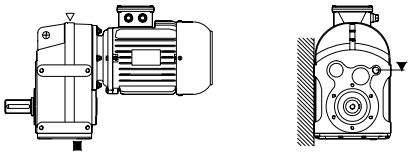
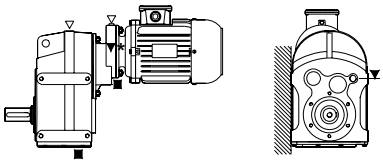
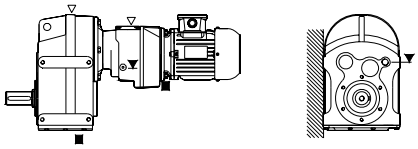
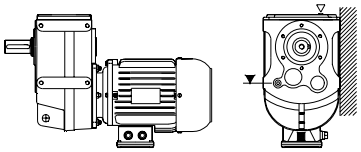
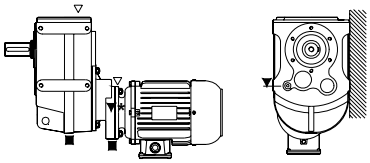
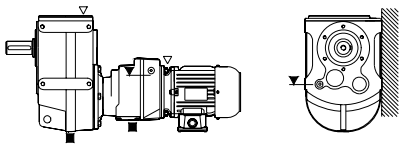
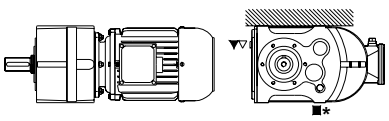
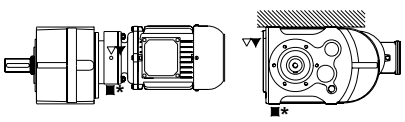
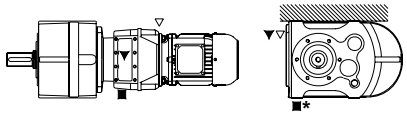
- Extended, intensive contact with oils can lead to skin irritations.
Avoid extended contact with oil, and clean oil off skin thoroghly.

- Hot oil can cause scalding.
When changing oil, protect yourself against contacting hot oil.

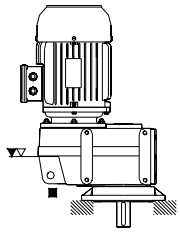
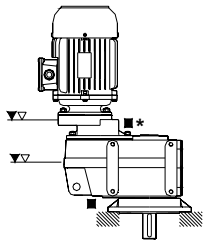
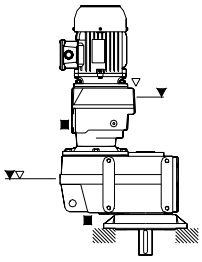
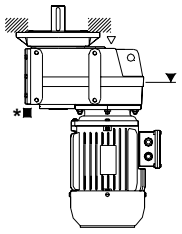
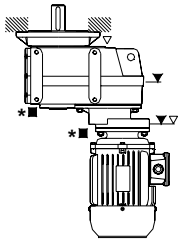
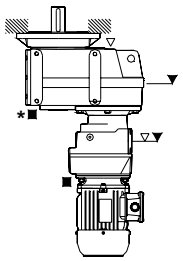
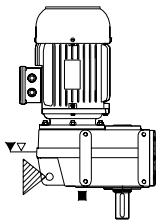
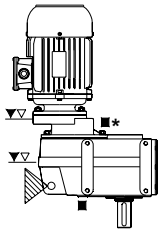
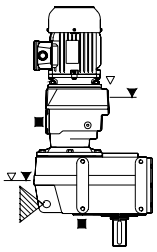
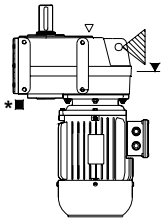
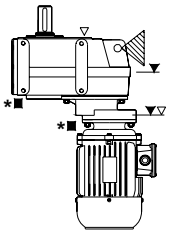
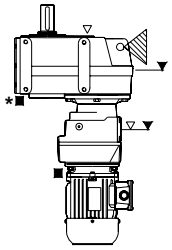
9.3-Oil Quantities. (lt)

Type Typ									
	B3	**B5**	**B51**	**B6 - B7**	**B8**	**V1**	**V3**	**V5**	**V6**
Double-Triple reduction Helical Hollow Shaft Types									
DR 202 / 203	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
DR 302 / 303	2,15	2,15	2,15	2,15	2,15	2,15	2,15	2,15	2,15
DR 402 / 403	5	4,5	4,5	5	5	4,5	4,5	4,5	4,5
DR 502 / 503	12	8,5	8,5	12	12	8,5	8,5	8,5	8,5
DR 602 / 603	16,5	16,5	16,5	16,5	16,5	18	16,5	18	18
DR 702 / 703	19,5	24	24	19,5	19,5	24	24	24	24
Four Stage Reduction Helical Hollow Shaft Types									
DR 404	5,0 / 0,7	4,5 / 0,7	4,5 / 0,7	5,0 / 0,7	5,0 / 0,7	4,5 / 0,7	4,5 / 0,7	4,5 / 0,7	4,5 / 0,7
DR 504	12 / 1,5	8,5 / 1,5	8,5 / 1,5	12 / 1,5	12 / 1,5	8,5 / 1,5	8,5 / 1,5	8,5 / 1,5	8,5 / 1,5
DR 604	16,5 / 4,0	16,5 / 4,0	16,5 / 4,0	16,5 / 4,0	16,5 / 4,0	18 / 4,0	18 / 4,0	18 / 4,0	18 / 4,0
DR 704	19,5 / 4,0	24 / 4,0	24 / 4,0	19,5 / 4,0	19,5 / 4,0	24 / 4,0	24 / 4,0	24 / 4,0	24 / 4,0
Five-Six Stage Reduction Helical Hollow Shaft Types									
DR 305 / 306	2,15 / 0,7	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5	2,15 / 0,5
DR 405 / 406	5 / 1,2	4,5 / 0,85	4,5 / 0,85	4,5 / 0,9	4,5 / 0,9	4,5 / 0,85	4,5 / 0,85	4,5 / 0,9	4,5 / 0,9
DR 505 / 506	12 / 1,2	8,5 / 1,9	8,5 / 1,9	8,5 / 0,9	8,5 / 0,9	8,5 / 1,9	8,5 / 1,9	8,5 / 0,9	8,5 / 0,9
DR 605 / 606	16,5 / 1,5	16,5 / 1,75	16,5 / 1,75	16,5 / 1,2	16,5 / 1,2	16,5 / 1,75	16,5 / 1,75	16,5 / 1,2	16,5 / 1,2
DR 705 / 706	19,5 / 3,0	24 / 3,1	24 / 3,1	24 / 3,4	24 / 3,4	24 / 3,1	24 / 3,1	24 / 3,4	24 / 3,4

9.4- Mounting Positions

B3			
B5			
B5 I			
B6			
B6 II			
B8			

Symbols : ■ *: Drain plug* ▽ *: Vent plug* ▼ **:** *Oil level* ✳ **:***Only upon request*

V1			
V3			
H5			
H6			

Symbols : ■ *: Drain plug* ▽ *: Vent plug* ▼ **:** *Oil level* ✳ **:***Only upon request*

10- Troubleshooting Guide

All the operations bellow must be done by othirized and skilled mechanichan/electrican. Inform STÖWER before making any change to the gearbox. Only oil change is allowed to change without information. Do not make anythink if you are not sure what you are doing and contact Stöwer. Any change or operation done without the information of STÖWER is in your own risk and responsibility and Stöwer Antriebstechnik does not take any responsibility.

ID	Problem	Observation	Remedy
001	Gearbox Does Not Start Up	You hear no noise and shaft is not turning. You are not using any driver or frequency inverter.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Still does not work go to ID 100
002	Gearbox Does Not Start Up	You hear no noise and shaft is not turning. You are using frequency inverter or driver.	Please observe the frequency incerter/driver manual. Chech the motor by supplying direct voltage to see if the problem is on your driver/frequency inverter. Still does not work go to ID 001.
003	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are not using any driver /frequency inverter or braked motor.	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Still same problem, the load may be too high for the choosen motor. Loosen the gearbox from the load/torque. If it works than the starting torque is insufficient and higher motor power is needed. For monophaze motors, check the starting up condansator and running condansator as well. If notting helps go to ID 100
004	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are using driver or frequency inverter.	Please observe the frequency inverters or drivers manual. To see if the problem is on your driver or frequency inverter take out the driver/frequency inverter and make direct voltage supply to the motor according the motors nameplate. Still does not work go to ID 100
005	Gearbox Does Not Start Up	You hear some noise but both motor shaft and gearbox shaft is not turning. You are using braked motor	Please Check the voltage supply and frequency of your electric connection. They must be in accordance with the nameplate of the motor. Observe motor manufacturers start up manual. Be sure that the brake is working. Observe the brake manufacturers manuel. If brake is supplied from Stöwer observe this manuel for correct brake wiring diagram. If still not work supply the brake with voltage according its nameplate directly. For example 198V DC. You will hear a clicking noise explaining that the brake is opening. If you hear no noise the brake or rectifier is defect. If you hear the clicking noise the brake is working. You should this clicking noise by your normal electric connection as well. By supplying direct supply to the brake you hear the clicking noise and at same time you supply the motor with direct voltage according to its name plate and still same problem, the load may be too high for the choosen motor. Goto ID 003.

ID	Problem	Observation	Remedy
006	Gearbox Does Not Work in Low Speeds/frequencies.	You are using frequency inverter.	For very low speeds the frequency inverters frequency is lowering down. For very low frequencies the inverter parameter and motor parameter must be optimized. Also for low speeds the efficiency of the gearbox may varry too much. Specially for worm-gearboxes. The recomended frequency range is 20-70 Hz for worm-gearboxes and 10-70 Hz for Helical Gear Boxes. Use Higher motor power and Frequency inverter or change ratio of gearbox to work inside the reccomended range.
007	Gearbox Does Not Start Mornings or After Long Time Stop.	Ambient Temperature is below +5 Celsius	The oil is not in accordance with your working conditions. Change to lower viscosity oils. Observe this manuel for using the correct oil. Working in higher ambient temperatures is an other solution if possible. If still same problem you need higher motor power.
008	Gearbox is Heating Up too Much	You are using Worm Gear Box and ambient tenp is lower than +40 Celsius	Measure the surface temp. using a temperature measuring device under full load. If the temp is under +80 Celsius this will make no harm to the gearbox and is normal. All ATEX conforming gearboxes and standart worm gearboxes are designed to work under max. +120 Celsius. If higher than +120 Celsius and using ATEX conforming gear box immidiately stop the system and contact Stöwer Go to ID 100. If not ATEX confirming chec the oil type and oil quantitiy/level according your mounting position and check the nameplate mounting position. If nameplate mounting position does not fit the actual position goto ID 100.
009	Gearbox is Heating Up too Much	You are using Helical Gear Box. Ambient temp is lower than +40 Celsius	Measure the surface temp. using a temperature measuring device under full load. If the temp is under +80 Celsius this will make no harm to the gearbox and is normal. All ATEX conforming gearboxes are designed to work under max. +120 Celsius. If higher than +120 Celsius and using ATEX conforming gear box immidiately stop the system and contact . If not ATEX gearbox the gearbox i designed to work under max. +80 Celsious. If higher than +80 Celsius check the oil type and oil quantitiy/level according your mounting position and check the nameplate mounting position. If nameplate mounting position does not fit the actual position goto ID 100
010	Gearbox is Heating Up too Much	Ambient Temp is over +40 Celsius	Standart Gearboxes are designed to work under +40 Celsius. ambient temperature. If ambient temp is higher than +40 Celsius special solutions/gearboxes are required. Please contact
011	Gearbox is noisy	Nois is regular continious	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise motor bearings or gearbox bearings are defect. Change bearings. Goto ID 100
012	Gearbox is noisy	Nois is random	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you hear still the noise the oil may has some particles inside. Change the oil and look for small particles. If metal particles are found the gearbox may have some demage. Goto ID 100

ID	Problem	Observation	Remedy
013	Gearbox is noisy	Regular nocking noise	Check Your moving parts for noise. Disassemble the gearbox and run without load. If you still hear the noise one of the gears inside is defect. Goto ID 100
014	Gearbox is noisy	Regular up and down noise	Check the output-shaft connection alements for runout. Take out the output shaft element and run without load. If you still hear the noise one of the gears has runout problem. Goto ID 100
015	Gearbox is noisy	Gearbox is with braked motor and noise is comming from the brake side randomly.	Low randomly clicking noise may come from the brake disk which is normal. If noise level is disturbing the brake may be defect or brake clearance is not adjusted. Goto ID 100
016	Gearbox is noisy	You are using frequency inverter and the noise level is changing according your speed.	The frequency inverter parameters are not optimized for the frequency range or motor you are using. Observe the frequency inverters manual. If still same problem change the ratio of gearbox. Goto ID 100
017	Oil is Leaking	Oil Leakage from Seal	If ambient Temp is over +40 Celsious or none stop work over 16 hours please change the top plug with a breather plug. Observe this manual for using breather plug. If this is not your case the seal could be damaged. Goto ID 100
018	Oil is Leaking	Oil Leakage from Plug	If you are using breather plug be sure it is in the correct place. This is the most top plug position according your mounting position. The plug may be not tight enough. There are some particles under the plug rubber surface. Clean and tifgten the plug. If still same problem goto ID 100
019	Oil is Leaking	Oil Leakage from Housing	Observe exactly where the oil is comming out. It could be seal or plug point where it comes out and leakes over the housing. If this is your case goto ID 018/019. If you are sure oil comes out from housing than housing has some micro split / crack. Goto ID 100
020	Oil is Leaking	Oil Leakage from Cover	The sealing liquit under cover is split/defect. Disassemle the cover and put new sealing liquit. Assemle the cover and tighten the bolts. If still same problem goto ID 100
021	Gearbox is moving regularly on its mounting point	You are using Torque Arm	The movement of gear box is because of the runout of the shaft which you assemle the gearbox. This has no bad affect or harm to the gearbox and is normal unless you are using torque arm.
022	Gearbox is moving randomly on its mounting point	You are using Torque Arm	The movement of gear box is because of the runout and clearance of the shaft which you assemle the gearbox. Check the clearance of the assemling shaft and the clearances on your machine. This has no bad affect or harm to the gearbox unless you are using torque arm.
023	Motor is heating up	Motor is running over its nominal current	The motor power is not enough or some overload to the motor is possible. The motor may be defect. Goto ID 100
023	Motor is heating up	Ambient is dusty	Check the motor Fan Hub and rips. They must be free of dust. If you are using forced external fan, check if it is working. If you are using frequency inverter in low speeds and you do not have forced external fan, you may need forced external fan. Goto ID 100

ID	Problem	Observation	Remedy
024	Motor is running but Gearbox shaft does not turn	Scratchinh noise comes out	Some part (key, gear) may be defect inside gearbox. Goto ID 10
025	Gearbox Housing is Defect	You are using chain drive or pinion gear	The radial load or poligon effect of the chain may have caused the damage. Check also if the assembly bolts are loosened or the plate you assemble the gearbox is rigit enough. Check if you are using the correct diameter of chain drive and you are not exceeding max. allowed radial load. Check the position of your output element and re-calculate your radyal load and check if this fit to the maximum allowed radial load. Goto ID 100
026	Output Shaft is Defect	You are using chain drive or pinion gear	The radial load or poligon effect of the chain may have caused the damage. Check also if the assembly bolts are loosened or the plate you assemble the gearbox is rigit enough. Check if you are using the correct diameter of chain drive and you are not exceeding max. allowed radial load. Check the position of your output element and re-calculate your radyal load and check if this fit to the maximum allowed radial load. Goto ID 100
027	Gearbox is stopping too late	You are using braked motor	Please check the wiring diagram of the brake. There are two different kind of brake wiring diagram. The standart gearbox delivered from our factory is set to delayed braking. For sudden braking check the wiring diagram.
028	Gearbox is starting too late	You are using braked motor	For fast opening of big brakes (over 100Nm), you may need shock transformators which is supplied by Stöwer . Goto ID 100
100	ervice Required	No self solution foun	Please contact Stöwer Service point. See on the back side of this manual. Changing mechanical parts of gearbox can only be done by STÖWER or with information Stöwer . Any change without informing Stöwer will cancel the waranty, manufactor decleration and will take no waranty, manufacturer decleration and responsibility

11- Disposal

If your product is no longer of use and you wish to dispose of it, refer to the instructions here. If you have any questions regarding ecological disposal methods, please consult our service points given on the backside of this manuel.

11.1- Disposal of Oil

-Lubricants (oil and greases) are hazardous substances, which can contaminate soil and water. Collect drained lubricant into suitable receptacles and dispose of it according to the valid national guidlines.

11.2- Disposal of Sealings

Remove the sealing rings from the gear reducer, and clean them of oil and grease resudies. Dispose of the sealings as composite material (metal/plastic)

11.3-Disposal of Metal

Divide up the remainder of the gear reducer into iron, aluminium, non-ferrous havy metal if possible Dispose of it according to the valid national guidlines.